Improved!

BELOIT HORIZONTAL
Dual Press

PATENTS PENDING

● The Beloit Horizontal Dual Press has been improved by incorporating a primary roll over the first suction press, adding another nip. Thus, this press is now equivalent to three presses instead of two, the first suction roll doing double duty.

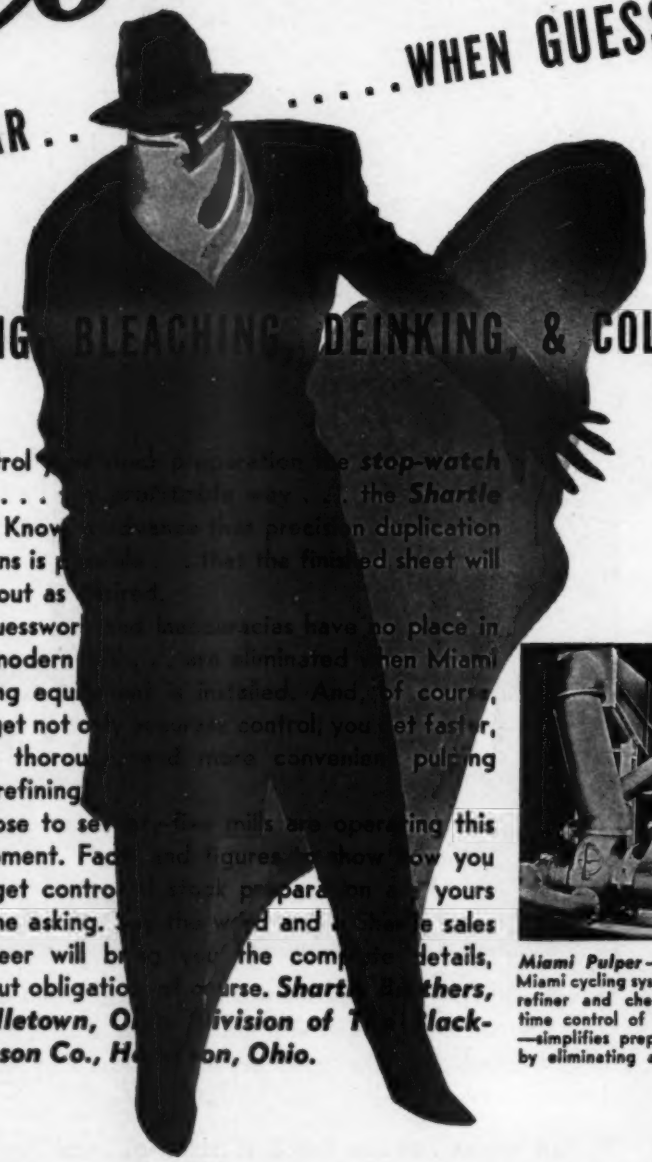
● The success of the Beloit Horizontal Dual Press has been definitely established. This new press gives even better results.

THE BELOIT WAY BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS. **IS THE MODERN WAY**

BELOIT IRON WORKS BELOIT WISCONSIN

Robbed!

PROFITS DISAPPEAR . . . . . WHEN GUESSWORK RULES STOCK PULPING, BEATING, BLEACHING, DEINKING, & COLORING

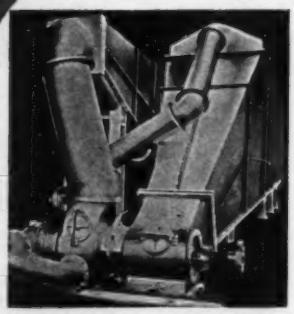


Control your stock preparation the *stop-watch* way . . . the guesswork way . . . the *Shattle* way. Know that precision duplication of runs is possible . . . that the finished sheet will turn out as planned.

Guesswork and its fallacies have no place in the modern mill. They are eliminated when Miami cycling equipment is installed. And, of course, you get not only accurate control, you get faster, more thorough and more convenient pulping and refining.

Close to seventy-five mills are operating this equipment. Facts and figures to show how you can get control of stock preparation on yours for the asking. Send the word and a Shattle sales engineer will bring you the complete details, without obligation, of course. ***Shattle Brothers, Middletown, Ohio, Division of The Black-Clawson Co., Hamilton, Ohio.***

Exact Duplicates . . . but different runs. Miami cycling equipment permits accurate control . . . eliminates guesswork. Decide that you too must have the advantages of time-controlled stock preparation.



Miami Pulper — Pulping end of Miami cycling system. It, with Miami refiner and chest, permits exact time control of stock preparation —simplifies preparation schedules by eliminating all guesswork.

Shattle Bros.
CYCLING SYSTEMS

A Record of Peak Performance

...It's Been Going On For Years

ALLIS-CHALMERS TURBINE in Greenville, S. C., power plant. Supplies power for the Union Bleachery and the Village. Since started up in 1930, it has been lubricated exclusively with Texaco Regal Oil "B."

NOW in its tenth year of operation, this Allis-Chalmers Turbine has given such an excellent account of itself that the operating personnel is highly pleased.

No enforced shutdowns, no unnecessary cleaning, no unusual care of any kind.

Since this machine started turning over in 1930, it has been lubricated with Texaco Regal Oil "B."

As thousands of turbine operators know, Texaco Regal Oils resist oxidation, emulsification, sludging. They keep bearings, governor, gears and cooler-pipes clean, assuring satisfactory performance for years on end.

Let Texaco engineers help you to make lubrication savings in your turbine with Regal Oils. For this service, phone any one of more than 2300 warehouses, or write:

The Texas Company, 135 East 42nd St., New York, N.Y.

YEAR AFTER YEAR THOUSANDS OF TURBINES ON LAND AND SEA ARE EFFECTIVELY LUBRICATED WITH TEXACO.

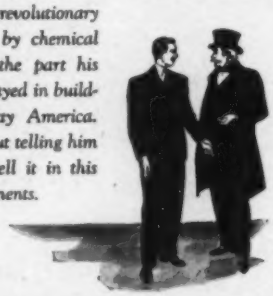
TEXACO

TEXACO REGAL OILS

Texaco Dealers invite you to tune in The Texaco Star Theatre—a full hour of all-star entertainment—Every Wednesday Night—Columbia Network—9:00 E.S.T., 8:00 C.S.T., 7:00 M.S.T., 6:00 P.S.T.

10,000
HORSELESS CARRIAGES A DAY

Suppose someone who lived forty or fifty years ago—say one of the founders of Mathieson—could pay us a visit today. And suppose we could have the pleasure of showing him the sights of 1940, of explaining the vast changes that have taken place since the turn of the century. What do you think would amaze the old gentleman most? If he were one of the pioneers who founded Mathieson, we believe he would be most interested in the revolutionary changes wrought by chemical progress and in the part his successors have played in building the present-day America. We would go about telling him the story as we tell it in this series of advertisements.



● **Yes, Mr. M.—the modern world is using over forty million motor vehicles, and a new generation has grown up who never heard the old jeer, "Get a horse!" New highways criss-cross the continent, dotted with fleets of motor-trucks, motor-buses and a multitude of family cars.**

Your successors at Mathieson, Mr. M., have had their share in promoting the growth of the great automotive industry which has "put the world on wheels". For Mathieson Chemicals enter into the manufacture or processing of nearly everything about the modern motor vehicle—glass, upholstery, tires, lacquer finish, plastic and metal parts, high test gasoline, oil and grease—even lamp filaments in headlights and anti-freeze in the radiator!

Constantly pioneering—constantly improving production and distribution methods to achieve new standards of quality and economies in raw materials—Mathieson has made basic contributions to the development of this and other great American industries.

MATHIESON CHEMICALS

CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . NITH PRODUCTS . . . AMMONIA, ANHYDROUS . . . FUSED ALKALI PRODUCTS . . . SYNTHETIC SALT CAKE . . . DRY ICE . . . CARBONIC GAS . . . ANALYTICAL SODIUM CHLORIDE

THE MATHIESON ALKALI WORKS (INC.)

THE PAPER INDUSTRY and PAPER WORLD

VOLUME 21
NUMBER 12
MARCH, 1940

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FRITZ PUBLICATIONS, Inc.

Founded by
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WIRE

A STANDARD OF COMPARISON FOR 62 YEARS!

EASTWOOD-NEALLEY CORP.

BELLEVILLE NEW JERSEY

BAKER TRUCKS *are saving Time and Space (and Money) for* CHAMPION PAPER MILLS

Baker Hy-Lift Trucks loading skids of paper into box car at Champion's Hamilton Mill.

Baker Trucks make quick work of unloading a car of baled pulp for Champion Paper.

● A large fleet of Baker Trucks serves The Champion Paper and Fibre Company from the unloading of baled pulp to the delivery of the finished sheets and rolls to storage or shipment . . . Faster handling, greater maneuverability and heavier loads cut time and overhead. Tiering saves storage space . . . Like many other companies, Champion meets the demand for increased production without expansion with Baker Trucks. If this is *your* problem, Baker can help you, too.

Heavy rolls of Champion paper are carried quickly, easily and economically on Baker Platform Trucks.

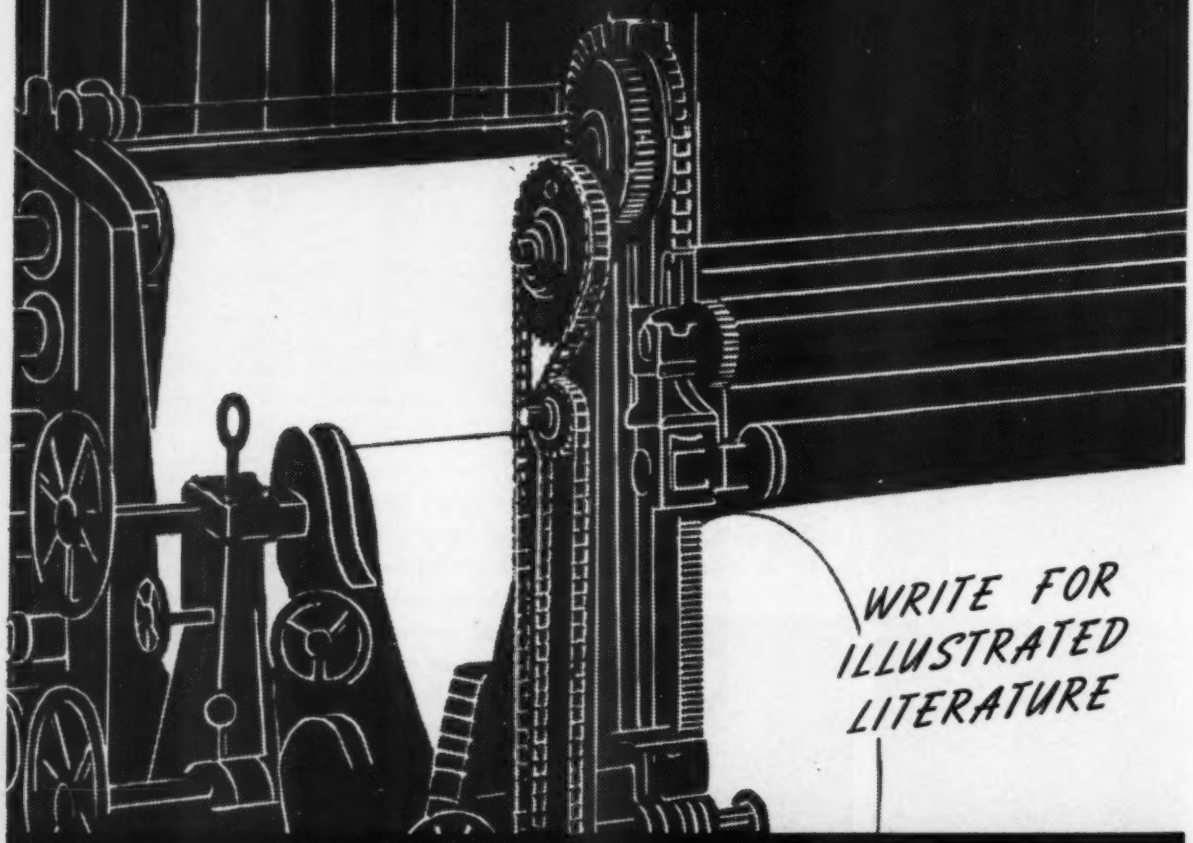
Baker Hy-Lift Truck tiers skids of paper sheets to conserve space in the Champion warehouse.

BAKER INDUSTRIAL TRUCK DIVISION
of the Baker-Raulang Company
2169 WEST 25TH STREET • CLEVELAND, OHIO

Trade mark Registered U. S. Pat. Off.
Baker INDUSTRIAL TRUCKS

CAMACHINE

WINDERS AND REWINDERS
FOR FASTER PRODUCTION
OF BETTER NEWSPRINT,
BOOK AND KRAFT ROLLS



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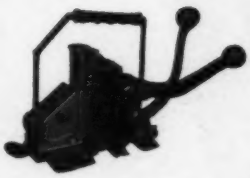


HANDLING and SHIPPING ECONOMIES ADD TO MILL INCOME

—with this Acme Steelstrapper

● Packing and handling costs are reduced to a minimum in many paper mills by the Acme No. 2 Steelstrapper. Lost motion is eliminated and maximum speed is attained wherever this one-piece Steelstrapping tool is used. It tensions, seals and cuts the strap in addition to feeding seals automatically. Especially designed for the paper industry, for strapping skids and other heavy packs. All of the advantages of Steelstrapping are assured for either top or side strap applications.

The Acme Steelstrap Process helps to increase profits by safeguarding customer good-will, lowering freight charges (less dunnage), saving time and material and assuring adequate protection at minimum cost. Mail the coupon today, for the illustrated booklet, "Stopping Profit Leaks." It may suggest ways in which you, too, can make important savings. There is no obligation.

ACME UNIT-LOAD PROCESS

The Acme Unit-Load Process provides a scientific flat band method of bracing cars of paper for safer, more economical shipments. In the shipment shown at the left, several hundred pounds of dunnage were eliminated by the use of the Acme Unit-Load Process and the car can be unloaded in less time. Complete information about the Acme Unit-Load Process as applied to paper shipments is contained in the Unit-Load booklet. Mail the coupon for your copy today.

ACME STEEL COMPANY

2851 ARCHER AVENUE, CHICAGO, ILLINOIS

Branches and Sales Offices in Principal Cities

ACME STEEL COMPANY
2851 Archer Ave., Chicago, Ill.

☐ Send a copy of "Stopping Profit Leaks Beyond the Production Line"

☐ Mail a copy of the Unit-Load booklet

Name.....

Address.....

City.....*State*.....

"Paper Is the Keystone..."

I AM the paper industry—
The prophet of progress—the herald of evolution!
Noble men have labored for me;
History would die without me;
Art demands me.
Invention writhes upon my surface
And music is indelibly intimate with me.
But for me commerce must halt, finance cease, and trade stop—
For processes depend upon me and progresses are made by me.
I alone measure the advance of civilization.

(From *The Paper Industry*, April, 1931.)

The Nation Salutes Its

"Modern Pioneers"

▶▶▶ MODERN PIONEERS — the present day equivalents of such men as Fulton, Whitney, McCormick, Thompson, Edison and others—were honored during the month of February in special celebrations commemorating the 150th anniversary of the American patent system.

The realization that encouragement was not only needed for those individuals who sought to make a home in a rugged wilderness but also for those who pioneered in the invention and discovery of new products and industries, caused George Washington to urge Congress to give "effectual encouragement" to the introduction of new inventions and resulted in the first patent act, signed by President Washington on April 10, 1790.

The patent system, as revised and perfected by the law of 1836, is undoubtedly a major factor in the great industrial progress of the United States. It is largely because of the protection afforded by the patent system that manufacturing has grown to a dominating stature in today's industrial life.

The National Association of Manufacturers, recognizing the great value of the patent system, decided early last year to stage a unique celebration of the system's anniversary.

As worked out by the committee of eighty leading industrialists, headed by Robert L. Lund, executive vice president of the Lambert Pharmacal Company, the association's program honors the living pioneers whose discoveries of new products and services have contributed most to raising the standard of living, and those who are now perfecting other discoveries which may lead to thousands of new jobs.

The modern pioneers were selected by a committee headed by Dr. Karl T. Compton, president of the Massachusetts Institute of Technology, who was aided by an able staff of noted scientists and educators.

Members of professional engineering and scientific societies, manufacturers and trade association executives were then asked to nominate those living inventors deemed outstanding modern pioneers. From the 1,000 nominations thus submitted the committee picked almost 500 inventors to receive modern pioneer scrolls.

Beginning February 7, the inventors were honored at regional pioneer dinners held by the National Association of Manufacturers in co-operation with local industrial associations in Cleveland, Minneapolis, San Francisco, Detroit, Philadelphia, Hartford, Los Angeles, St. Louis, Baltimore, Rochester, Chicago, Boston and Cincinnati. From the 500 inventors honored at these banquets, the association's committee picked nineteen adjudged to have made outstanding contributions to American progress in the past twenty-five years. These were entitled National Modern Pioneers.

On February 27, before some 1,500 representatives of industry and government, the association climaxed its celebration of the 150th anniversary of the patent system by awarding silver plaques to the honored group. Since one of the awards was to a group of inventors, those honored actually totaled twenty-nine. All were guests at a dinner at the Waldorf-Astoria in New York City.

The program included addresses by Dr. Compton, Charles F. Kettering, vice president of the General Motors Corporation, Conway P. Coe, United States Commissioner of Patents, and H. W. Prentis, Jr., president of the National Association of Manufacturers and of the Armstrong Cork Company. (A list of the men in this honored group appears on the next page.

Although the complete list of the five hundred honored modern pioneers has not, as yet, been made available, a partial list discloses many names well known to the pulp and paper and allied industries.

▶▶▶ The Crown Zellerbach Corporation boasts two modern pioneers in the persons of A. G. Natwick, assistant manager of the Camas (Washington) mill of the Crown Willamette Paper Company, and W. R. Barber, technical director of C-Z. These two men, collaborating with M. W. Phelps, now with the Solvay Chemical Company, Syracuse, New York, developed a method of "copperizing" tissue fruit wrap to prevent botrytis rot in pears.

Three men from the Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, were among the honored five hundred. Walter Geist, vice president, received his award for the invention of the Texrope drive; Dr. W. M. White, manager and chief engineer of the company's hydraulic department, was awarded for his invention of the "Hydraucone" draft tube for hydraulic turbines, and R. C. Newhouse, chief engineer of the company's crushing and cement division, was honored because of his invention of the "Newhouse" and "Type R" high speed crusher and his "Concavex" grinding bodies for cement and ore grinding mills.

Scrolls were awarded to three members of the Norton Company, Worcester, Massachusetts. These men are: Thure L. F. Larsson, mechanical engineer; Elmer C. Schacht, vice president of the company's subsidiary, Behr-Manning Corporation of Troy, New York, and Raymond R. Ridgway, director of abrasive research. Mr. Larsson was issued a patent in 1926 for a segmental grinding wheel—the Norton pulpstone. He also invented the basic elastic bolt which is the foundation of the pulpstone. Mr. Schacht's inventions are many and varied, but he is best known for his invention of electrocoated sandpaper and to have made broad disclosures on some of the essential principles in the electrostatic field. Mr. Ridgway was designated a modern pioneer because of his researches and his inventions with the abrasive known as Norbide.

For the modern miracle of transforming glass into thread-like fibers Games Slayter, vice president of the Owens-Corning Fiberglas Corporation, Toledo and Newark, Ohio, was made a modern pioneer by the committee.

Other prominent modern pioneers and their contributions to progress include the following:

Marvin Pipkin, General Electric Company's lamp development laboratory, for his development of the inside frosting process for lamp bulbs.

Alfred F. Harris, chairman of the board of Harris-Seybold-Potter Company, for his development of the method and machinery of the offset lithographic method of printing.

Hayden B. Kline, vice president in charge of plant operations at the Industrial Rayon Corporation, for the new continuous process by which viscose rayon yarn is spun, after-treated, dried and twisted in a single integrated operating sequence.

Samuel B. Kraut, Westinghouse Electric and Manufacturing Company, for the sodium vapor lamps.

John C. Lincoln, chairman of the board of the Lincoln Electric Company, for achievements in electric arc welding bringing wide application to industry at greatly reduced costs.

Brief reports of others who received modern pioneer scrolls include: Dr. Carl Lewis Beal of the American Anoda, Inc., Akron, Ohio, for electrodeposition of latex rubber on metals; Tracy V. Buckwalter, of Timken Roller Bearing Company, Canton, Ohio, industry and transportation; Dr. Frank Conrad, Westinghouse Electric and Manufacturing Company, short wave broadcasting; Clyde C. Farmer, Westinghouse Air Brake Company, railroad car brakes; Dr. Ralph E. Hall, Hall Laboratories, Pittsburgh, chemistry; John K. Hodnette, Westinghouse Electric and Manufacturing Company, Sharon, Pennsylvania, new distribution transformer; Waldo L. Semon, B. F. Goodrich Company, Akron, Ohio, development of synthetic rubber, "Koroseal."

Through its celebration, the National Association of Manufacturers brought out that, contrary to ideas voiced recently, the day of industrial pioneering is not completed. Most of the discoveries of the national modern pioneers are still in the early stages and their development, it was pointed out, will create many thousands of additional jobs. In celebrating the patent system the association showed that initiative and enterprise are still required and that an unrestricted patent system is vital to give impetus to their disto bring new products into the market covery.

TWENTY-NINE PIONEERS AWARDED SILVER PLAQUES

Dr. Edwin Howard Armstrong of Columbia University, inventor of the super-heterodyne radio receiver and more recently of the system of frequency modulation for broadcasting.

Dr. Leo Hendrik Baekeland of the Bakelite Corporation, one of the founders of the plastics industry, through his development of Bakelite.

Dr. William Meriam Burton, formerly president of the Standard Oil Company of Indiana, a pioneer in petroleum cracking, which has greatly increased the yield of gasoline from petroleum.

Dr. Willis Haviland Carrier, chairman of the Carrier Corporation, "one of the most prolific inventors of equipment for the control of temperature and humidity."

Dr. William David Coolidge, director of Research Laboratory, General Electric Company, inventor of ductile tungsten and a new and improved X-ray tube.

Dr. Frederick Gardner Cottrell, Washington, D. C., a pioneer in the purification of fumes from blast furnaces and in the recovery of valuable products from gases.

Dr. George Oliver Curme, Jr., vice president of Carbide and Carbon Chemicals Corporation; his numerous inventions and discoveries in connection with hydrocarbon compounds have resulted in scores of new chemical products.

Dr. Lee De Forest, Los Angeles; his 300 inventions have formed the bases of many modern devices essential to the radio, telephone, television, and sound pictures.

John Van Nostrand Dorr, president of the Dorr Company, Inc., New York; his inventions made immeasurable contributions to the recovery of gold and other metals from low-grade ores and to the scientific treatment of sewage.

Henry Ford, founder of the Ford Motor Company, ingenious inventor and founder of the modern automobile industry because of his pioneering in mass production.

Charles F. Kettering, vice president, General Motors Corporation, an inventor of devices for electric starting of automobiles, machinery for refrigeration, and equipment for farm lighting.

Edwin Herbert Land, president, Polaroid Corporation, Boston. He made possible antiglare glasses, lamps and windows, and aided three-dimensional movies.

Dr. Irving Langmuir, associate director of the Research Laboratory, General Electric Company, the inventor of the gas-filled electric lamp.

Dr. Harry Steenbock of the University of Wisconsin, the originator of the process of irradiating foods which led to the production of Vitamin D milk and bread.

John B. Tytus, vice president, American Rolling Mill Company, one of the men most responsible for the cold process of rolling steel.

Charles Frederick Wallace, vice president, Wallace and Tiernan Company, Inc., one of the men most responsible for the chlorine treatment of drinking water.

Orville Wright, Dayton, Ohio, who, with his brother, Wilbur, was the first successfully to fly a heavier-than-air machine.

Dr. Vladimir Kosma Zworykin, director of Electronic Research, RCA Manufacturing Company, inventor of the "iconoscope" used in picture and television transmission.

The inventors of Nylon, eleven men from E. I. du Pont de Nemours and Company, Inc.: *Wallace H. Carother* (deceased), *Willard E. Catlin, Donald D. Coffman, Winfield W. Heckert, Benjamin W. Howk, George D. Graves, Wilbur A. Lazier, John B. Miles, Jr., Wesley R. Peterson, Frank K. Signaigo, and Edgar W. Spanagel.*

—(Courtesy of *Newsweek*)

COMING EVENTS

March 26-29 — American Management Association, Tenth Conference on Packaging, Packing and Shipping, Hotel Astor, New York City.

April 1-6—Coastal Empire Paper Festival, Savannah, Georgia.

April 8-12—American Chemical Society, Annual Meeting, Cincinnati, Ohio.

April 10-12—International Acetylene Association, Annual Convention, Schroeder Hotel, Milwaukee, Wis.

April 16-18—All-Ohio Safety Congress, Columbus, Ohio.

April 30-May 1-2—Greater Chicago Safety Council, 18th Annual Midwest Safety Conference, Chicago.

May 19-20—National Paper Box Manufacturers Association, Twenty-second Annual Convention, Coronado Hotel, St. Louis, Missouri.

May 23—Thirteenth Annual Fox River Valley and Lake Shore Safety Conference, Marinette, Wisconsin.

June 18-20—American Pulp and Paper Mill Superintendents Association, Annual Meeting, Netherland-Plaza Hotel, Cincinnati, Ohio.

Aug. 20-23—Technical Association of the Pulp and Paper Industry, Fall Meeting, Seattle, Washington.

Oct. 7-11—National Safety Congress and Exposition, Stevens Hotel, Chicago.

"Please get out of my boudoir"

SAYS THE MATRON ON PAGE 43 TO THE TAPIR ON PAGE 44

"I wish to go," replies the Tapir. "But, madam, I'm *show through* from the next page. Can't you get my situation?"

"I'll get you if you don't get out! *The very idea...*"

"Ah, that's it, madam. The idea is to talk with your paper manufacturer."

"This is past the talking stage," says the Matron, raising her mirror. "It's time for . . ."

"Krebs Pigments, certainly," the Tapir dodges. "Madam, you are *so* quick! Just tell him they take *show through* out of even the thinnest paper."

"It's bad luck to break a mirror," says she, deciding to lower her arm. "Will these Krebs Pigments wipe you out?"

"They're certainly clean. You'll get white, bright paper that prints sharp and clear on both sides."

"A lot of bother for just one Tapir," she sighs.

"Why, it's easy. Krebs helps with technical information. They've pigment colors for paper, too. Just *you* ask."

KREBS PIGMENT & COLOR CORP.

1007 Orange Street...Wilmington, Delaware

WISCONSIN MILLS ORGANIZE FOR WASTE DISPOSAL RESEARCH

The ten Wisconsin paper mills which recently combined in an effort to solve the stream pollution problem of the Fox and Wisconsin rivers, have created an organization known as the Sulphite Pulp Manufacturers' Committee on Waste Disposal. These companies agreed to finance the necessary research and other investigations and have placed the administration in the hands of an executive committee comprised of one representative from each company. (cf. THE PAPER INDUSTRY AND PAPER WORLD, p. 941, Dec. 1939).

A technical committee has been appointed with Henry A. Rothchild, technical director of K-C as chairman and with N. L. Malcove, technical superintendent of Northern Paper Mills, as secretary.

The first work which the executive committee has authorized is the study of the biological phase of waste disposal and the employment of a consultant of high standing and wide experience. This consultant will have at his disposal the laboratories and facilities of the Institute of Paper Chemistry at Appleton, Wisconsin. Following this study, it is contemplated that a pilot plant will be erected and operated for the purpose of determining the feasibility of the results of the laboratory work. Concurrently with this program the committee has authorized a careful and exhaustive study of all presently known processes for handling waste liquors through evaporation and incineration. It is expected that the work will furnish an authoritative determination of the feasibility of disposing of waste sulphite liquor by biological means.

The committee further commented that one of the difficulties which has faced not only all industry but also public officials in their consideration of the questions of industrial waste, has been to co-ordinate and properly evaluate the public necessities with the economic problems of industry in waste disposal. Industry in any state operates in a highly competitive field and the interests of those employed in industry as well as the owners of industries, require that waste disposal problems be worked out on a cost basis which does not place the products of a particular producer in a noncompetitive position because of excessive costs.

A third phase recognized by the committee involved the question of utilization through the production of by-products which may find or create an entirely new market. This investigation may, of course, take several years and it is the purpose of the committee to subordinate this portion of the program to the immediate problem of disposal. It has, however, authorized an initial study upon which a report is to be submitted to the executive committee designed to indicate the course which the utilization study may take.

The original decision of the ten Wisconsin sulphite mills to combine their efforts to finance a research program in order to solve the problem of stream pollution came about as a result of a survey completed recently, which indicated that paper mills had caused excessive pollution in the Wisconsin and Fox Rivers (cf. THE PAPER INDUSTRY AND PAPER WORLD, p. 842, Nov. 1939). It is the hope of the Wisconsin mills concerned to be the leaders in the solution of this problem.

FINANCIAL

The falling off in production during February was a normal flattening out after the phenomenal rise of late 1939, and the general situation indicates that with this seasonal drop over, there will be a steady heavy demand, with speculative buyong no longer in evidence.

Champion Paper and Fibre Company—Net earnings for the twelve weeks ending February 4 were $486,849, as against $222,438 for the similar period of 1938.

Consolidated Paper Company—Net earnings for 1939 were $933,043, as against $843,385 in 1938.

Hummel-Rose Fibre Corporation—Net earnings for 1939 were $192,144, as against $53,450 for 1938.

Oxford Paper Company—Net earnings for 1939 were $673,787, as against $159,419 for 1938.

Puget Sound Pulp and Timber Company—Net earnings for 1939 were $80,307, as against a loss of $17,535 in 1938.

Scott Paper Company—Net earnings for common shares for 1939 were $1,736,093, as against earnings of $1,379,950 for the previous year, this being in addition to the coverage of the preferred dividends.

Strathmore Paper Company—Net earnings for 1939 were $337,733, as against $2,253 in 1938, the latter figure, however, being due in part to a flood loss of nearly $250,000.

Sutherland Paper Company—Net earnings for 1939 were $723,190, as against $585,146 for the year 1938.

Taggart Corporation—Net profit for 1939 was $597,648, as against $189,350 for 1938.

Union Bag and Paper Corporation—Earnings in 1939 were $965,532, as against net profit in 1938 of $903,892. The fourth quarter accounted for about half of the year's earnings.

S. D. Warren Company—Net earnings for 1939 of $465,916 were about three times the record of 1938.

Whitaker Paper Company—Net income for 1939 was $203,142, as against $153,726 in 1938.

New York Stock Exchange—Stocks

	Closing Prices Feb. 24 1940	Jan. 25 1940
A. P. W. Paper Co.	.....	*2⅛–3
Celotex	10⅜	10¼
Same Preferred	66¾	*62–64
Certainteed	7	6⅜
Same Preferred	32⅛	28⅜
Champion P. & F. Co.	22	23½
Same Preferred	105¼	*102–105¼
Container Corp.	16⅛	16⅜
Cont. Diamond	7⅛	6⅞
Crown Zellerbach	16⅝	16
Same Preferred	90	90¾
Dixie Vortex	12¾	*12–12¾
Same "A"	35⅜	35
Flintkote	19¾	19¼
Robert Gair	3⅜	3¼
Same Preferred	.....	14⅞
Gaylord Container	.....	12½
International P. & P.	12¾	12⅞
Same Preferred	57⅜	54½
Kimberly-Clark	36¾	*34⅞–36
MacAndrews & Forbes	33⅜	34½
Masonite	35½	38⅛
Mead Corp.	10¼	10½
Same Preferred	64	*60–67
Paraffine Co.	44	42
Same Preferred	.....	101½
Rayonier	17	18⅞
Same Preferred	28	28¾
Scott Paper	47	46½
Same Preferred	114	*112¾–114
Sutherland Paper	34½	29
Union Bag & Paper	13⅜	13⅞
United Paperboard	5¾	5
U. S. Gypsum	84¼	87
Same Preferred	179½	179–180½

New York Stock Exchange—Bonds

Celotex 4½%	87	88¾
Certain-teed 5½%	78⅛	77⅜
Champ. P.&F. 4¾%	106½	105½
Container Corp. 5%	101¾	101¾
Inter. P. & P. 5%	102¼	102
Same 6%	99	97
Mead Corp.	103½	105½

New York Curb Exchange—Stocks

Am. Boxboard	6	6½
Brown Co. Pfd.	24½	23⅜
Det. Pap. Products	1	1
Great Northern.	43	*43–43⅜
Hummel Ross	4⅞	*5⅛–5⅜
Nat. Container	10¼	11½
St. Regis	2¾	3
Taggart	5	5¼
United Wall Paper	2⅜	2⅛

*Closing Bid and Asked Prices.

BUILT *for the* PAPER INDUSTRY

nis is the only valve where the thru-put does not touch operating mechanism and where no accurately fitted rts are needed to effect a drip-tight closure.

WILL NOT

LEAK, CLOG, STICK, BREAK OR CORRODE

THE greatest achievement in valve design in a decade and a world beater for long life and low upkeep.

The construction of the valve is such that the body and bonnet assembly are two separate units. This feature permits the use of a standard cast iron bonnet on all valves, while the body can be made of any special alloys or of cast iron lined with glass, rubber or lead for corrosive services.

Stuffing boxes, seat grinding and other difficulties encountered with other types of valves are eliminated. The tough resilient diaphragm compensates tor any wear on the seat of this valve.

Available in two models —one for chemicals—the other for air and water. Sizes from 1/2" to 14".

HILLS-McCANNA CO.
2433 Nelson St.
Chicago, Ill.
Founded in 1870

Gives you all these advantages:

1. Streamline, low resistance flow.
2. Simple operating mechanism.
3. Keeps stock out of and separated from the bonnet and working parts.
4. Stock cannot become contaminated by oil, condensation, corrosion, etc.
5. Diaphragm makes closure certain, eliminating danger of plugged lines resulting from straining of water from stock due to a leaky seat.
6. When body is rubber lined, metallic contact with substances handled is entirely eliminated.

HILLS-McCANNA
SAUNDERS' PATENT
VALVES

MAKE NEWSPRINT FROM GUMWOOD AT F. PRODS. LAB.

Discovery of a possible means of utilizing the South's great supply of gumwood in the manufacture of semi-chemical pulp for newsprint was announced recently by the United States Forest Products Laboratory at Madison, Wisconsin.

Laboratory Director C. P. Winslow outlined the method by which the laboratory has been able to make newsprint "equal to the average commercial newsprint" by mixing unbleached semi-chemical pulp from southern gum wood with groundwood pulp from southern pine.

"While the use of gum semi-chemical pulp in newsprint has not been applied commercially, it offers two-fold advantages," Mr. Winslow said.

"First, owing principally to its higher pulp yield, the cost of semi-chemical pulp should be no greater than for groundwood and appreciably lower than that of either sulphite or semi-bleached kraft pulp. Secondly, gum is one of the southern hardwoods which constitute about one-half of the total forest stand in the South. This predominance constitutes a serious problem in forest management until some realistic means for hardwood utilization can be developed. There is now a real promise of such use in newsprint as production of this grade of paper increases in the South."

◆

NEW ENGLAND PULP NEWS

Purchasing agents may point to their filled warehouses and to unshipped stocks of woodpulp in pier sheds and railroad storage, yet the fact remains that many buyers are uneasy despite these evidences—concrete enough, as many can testify to the strong spot or near-future inventory position of the converting paper mills. In recent weeks the Boston and Maine Railroad has required importers to provide shipping instructions on all pulp discharged from the West coast, coastwise or import vessels, and such pulp had to be away from the docks within the free-time limit, usually six days. Some of it went to storage elsewhere, at Billerica, Massachusetts, for example, some of it to the mills.

The contradictory position of the market was further emphasized by a little "pressure pulp" (stock that had no immediate home), that had to be cleaned out at $52 for unbleached sulphite, $48 for kraft and $58.50 for bleached sulphite.

Finishing touches are being rushed on the new carton building of the Menasha Products Company, Division of Marathon Paper Mills Company, as well as the new general offices being constructed adjoining and to the east. Machinery is being installed in the carton plant and the occupation of the new offices will take place this month. The office building is set back from the road and is not visible in this picture taken looking east. The tower in the background is in front of the office.

To draw any sweeping deductions from this would be wholly erroneous. It is also known that our heavy dependence on Scandinavian unbleached sulphite has caused some mills to bid $60 dock within a fortnight of this writing and that at least one European mill was unable to accept.

Eastern pulp mills have tentatively set up their quarter price on bleached sulphite at $62.50 (up $2.50 per ton), but it is understood that some domestic pulp mills will not advance soda pulp beyond the $58 per ton delivered basis, at which it stands at present. Due to the scarcity of shipping space, following withdrawal of many intercoastal vessels for more profitable service elsewhere, much pulp is moving to eastern converting mills from northwestern pulp producers by rail. The added cost is not so great as might be imagined, in some typical instances being but $2 to $3 more than the water rate of 37½ cents a hundred pounds plus backhaul from the ports. These added charges under contract terms must be borne by the customers. If the war continues, it is a foregone conclusion that more of this intercoastal pulp will move by rail and second quarter quotations are expected to take this into account in making delivered prices.

During the past month a limited tonnage of southern U. S. A. kraft was offered to northern board and paper mills at $46 f.a.s. southern port, equal approximately to $49 or $50 c.i.f. northern port.

NEW GAIR PLANT IN CONNECTICUT

A new plant is to be erected by the Robert Gair Company, Inc., on a recently-purchased site in Portland, Connecticut. Complete equipment will be installed for the manufacture of corrugated shipping cases, floor display stands and other corrugated products.

The mill building will be a one-story structure with brick walls, concrete floors, wooden roof deck and will have approximately 14-foot headroom in the manufacturing space with 20-foot clearance in the roll storage department. The plant will be located on a special siding of the New York, New Haven and Hartford Railroad.

◆

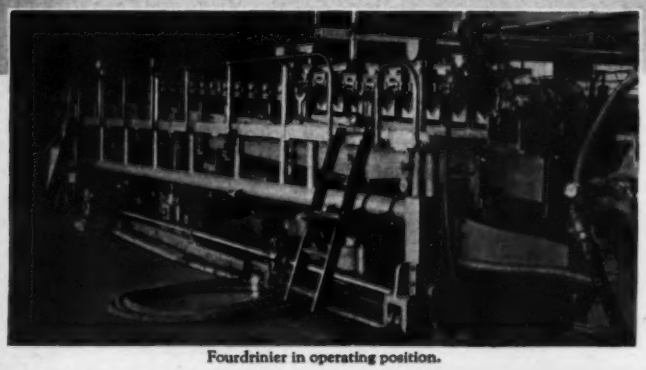
MODERNIZATION AT WHITING PAPER CO.

Considerable new machinery has been purchased by the Whiting Paper Company, Holyoke, Massachusetts, for its Number One mill, one of the oldest and most historic fine writing paper mills in the country.

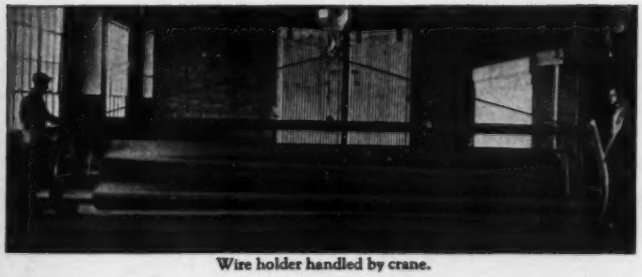
Dryers, calenders and cutters have been installed. The addition of this equipment will permit the machine drying of the heavy content rag paper and will result in a substantial increase in the productive capacity of the mill.

The Number One mill is the original Whiting Paper Company plant. One of the two machines there is the first of the Whiting fine paper ma-

...and it saves time and space to drape Fourdrinier Wires this new easy way.



Fourdrinier in operating position.



Wire holder handled by crane.

Under-carriage in position ready to drape wire.

Wire draped on under-carriage ready to install.

Views show installation of Fourdrinier Wires by exclusive Puseyjones "Rapidrape" Method, at Southland Paper Mills, Lufkin (Herty) Texas.

NOW there is a simplified method for installing Fourdrinier Wires—"Rapidrape" Wire Handling. This exclusive Puseyjones development requires less tending aisle space and shortens the handling time.

Wires can be draped in the tending aisle, then mechanically installed in operating position. The under-carriage is rolled into the aisle on suitable tracks set at or below floor level. Under-carriage in out position allows for quick and easy wash-up.

With "Rapidrape" Wire Handling, there is no danger of deflection stresses and distortion as experienced with complete removal or cantilever change. The Fourdrinier part remains in perfect alignment at all times, adequately supported at front and back. Can be installed without disconnecting shake mechanism, suction box hoses, showers or frame supports.

Be sure that your next machine is equipped with "Rapidrape" Wire Handling, as well as other patented improvements that make Puseyjones the leaders in the design and construction of paper-making machinery.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-making Machinery

Wilmington, Delaware, U. S. A.

chines installed when the concern was founded in 1865. It has been modernized several times since then. Paper made on this machine won the blue ribbons at the Philadelphia Exposition.

Originally all of the paper manufactured at the Number One division was loft dried but a few years ago air dryers were installed. This speeded up the output considerably but still necessitated the taking of the paper off the fourdrinier machines and putting it on the air dryers. With the new equipment, the paper can be dried right on the fourdrinier machines.

◆

WAGE AND HOUR COMMITTEE FOR PAPER INDUSTRY

The Wage and Hour Division of the Department of Labor has announced the personnel of the committee to recommend minimum wages for the pulp and paper industry. The committee, which will have its first meeting on March 18 for organization purposes, is headed by John A. Lapp of Chicago. Only about 15,000 workers of the 150,000 employed are now working for less than 40 cents per hour, it is believed.

Paper company representatives on the committee are: W. J. Alford, Continental Paper Company, Ridgefield Park, New Jersey; G. Alan Goldsmith, Mead Corporation, Chillicothe, Ohio; Stuart E. Kay, International Paper Company, New York City; L. J. Parant, St. Croix Paper Company, Woodland, Maine; Dwight Stocker, Michigan Paper Company, Plainwell, Michigan, and David J. Zellerbach, Crown-Zellerbach Corporation, San Francisco. The committee includes six union representatives and five representing the public.

◆

GAIR INSTALLS NEW SAND FILTER

The Robert Gair Company has just installed a new automatic self-cleaning sand filter in its Piermont (New York) plant which, it is said, will enable the company to eliminate some of the waste occasioned by loss of fibers, chemicals and heat units.

This installation consists of a large sedimentation tank, about 40 feet by 10 feet, large enough to allow the normal flow of 2,000 gallons per minute to remain in this settling tank for a period of twenty minutes. Most of the floating solids, composed principally of cellulose fibers and clay, sink to the bottom of this tank and are removed and pumped back into the mill. The fluid is then pumped to the sand filter tank and is required to go through a thick bed of sand.

Sand has been recognized for hundreds of years as one of the safest and most effective filters but it has always been difficult to keep the sand clean. In this new installation, there are self-cleaning devices which take off any solids which may have escaped the settling tank and these too are pumped back to the mill. The net result of this installation, it is said, is that fluids passing through the sedimentation tank and the sand filter, emerge as clear as the water taken into the mill for the making of paperboard.

The 110-foot brick smokestack of the old Union Bag and Paper Company was felled recently by the lessee of the property, Thilmany Pulp and Paper Company. The 35-year-old stack was toppled in order to clear land to the south of the mill, which is being remodeled.

◆

FIRE DESTROYS WISCONSIN MILL

Fire caused damages to the extent of $25,000 to the old Little Chute Pulp and Paper Company building at Combined Locks, Wisconsin, on February 9. Fire departments of Little Chute, Combined Locks and Kimberly fought the flames during most of the afternoon but were unable to save the 40-year-old brick building.

The structure was owned by the Green Bay and Mississippi Canal Company and was leased by the Combined Locks Paper Company, which operated the pulp mill until about two years ago. At the time the fire started workmen were removing machinery and metal parts to prepare the building for the storage of pulp. It is believed that an acetylene torch may have ignited the oil-soaked floor. Firemen were able to save about 800 tons of pulp.

◆

C-W COMPLETES STORAGE UNIT

A contract has been let for the completion of a construction program started last year for the extension of bag storage facilities of the Crown Willamette Paper Company, Camas, Washington. A four-story addition, 176 feet long and 42 feet wide, will be added to the unit, complete last

The groundwood mill of Combined Locks Paper Company, Combined Locks, Wisconsin, photographed shortly after the east wall had toppled into the Fox River. The mill, formerly known as The Little Chute Pulp Company, was destroyed by fire on February 9.

What OIL for GEARS?

For lowered replacement cost, less noise and more power transmitted, the right lubricant is essential

INSIDE YOUR GEAR BOXES, nearly everyone is agreed on what the proper lubricant should do. It should: (1) lower replacement cost by holding wear to a minimum; (2) cut down power losses; (3) give quiet operation.

The difficulty comes when you try to prescribe the lubricant which best accomplishes all three jobs in any individual set of gears. And since noise is the symptom of trouble most easily observed, too often a hasty operator simply pours in a heavy oil, gets a quieter action, and hands himself a medal for his smartness. He may discover later that he has raised his power cost by 15%.

HIGH PRESSURE, SMALL AREA

Here's the chief reason why gear lubrication is difficult. Your lubricant must form an oil film—

***Not* between two flat surfaces**
***Not* between a concave and a convex surface**
BUT between *two convex surfaces.*

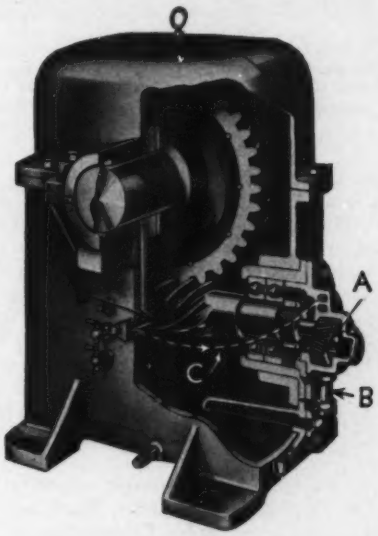
It is possible even between two convex surfaces to form the oil wedge which gives the most effective film. But it's the most difficult condition of all. As the teeth slide over each other, the oil-wedge action is abrupt, and intense pressure is forced upon a small area. (*See diagram at left.*)

Diagram showing how the meshing teeth of spur gears, under ideal conditions, form an oil "wedge."

HOW FAST DO THEY TURN?

The speed of each gear closely affects the formation of the necessary oil film. Slow-moving gears with large teeth need an oil film which stands up under pressure.

On the other hand, a high speed may tend to throw the oil away from the meshing surfaces. Speed must be carefully considered when you set out to get the best oil for any gear box.



Worm gear set with self-contained oiling system

A—Gear-type oil pump.
B—Suction line to oil pump.
C—Oil lead from pump to spray nozzle.
D—Spray nozzle to gears.

NEW GEARS, AND GEARS NOW

What of the design of your gear teeth? In worm gears, for example, a large helical angle helps to form a strong oil film. But the sliding action in such a gear increases heat. So you're apt to need a heavier oil than you would for a spur gear operating under like conditions.

Further, the design of gear teeth tells what they were like *when new.* But it may be even more important, in selecting a lubricant, to find what the teeth are like now. After a certain amount of wear, tooth contact often hits just "the high spots"... and again you need to modify your lubricant.

All these factors and others, too, must be considered in any attempt to find the oil which attains the three vital objectives in your gears. Shell has studied the problem and will continue to study it. We have found that the right selection for any set of gears involves choosing from a wide range of lubricants.

Call in your Shell representative; give him the opportunity to study your gears in day-by-day operation and recommend the lubricant that will give the most satisfactory service at lowest cost.

SHELL

Shell Industrial Lubricants

fall. The new unit will add 29,600 square feet of storage.

The first two floors will be of concrete and the third and fourth floors will be of wood construction. Completion of the storage building will provide a structure 400 feet long and 42 feet wide. The purpose of the addition is to allow ample sforage to take care of fluctuation between sales of finished bags and production of bag paper, and to relieve the present congestion in the basement of the adjoining bag factory.

◆

GAMBLE VICE PRES. OF FLORIDA PULP AND PAPER CO.

The Florida Pulp and Paper Company, which is planning the erection of a mill at Pensacola, Florida, will have one of the leading paper-making executives of the country, John T. Gamble, as its vice president, it was announced recently by J. H. Allen, president of the newly-formed company. Mr. Gamble has resigned his post as plant manager of the Union Bag and Paper Corporation's Savannah (Georgia) plant to accept the new position. He will also be a director of the Florida company.

The new company is now being successfully financed, Mr. Allen stated, and actual construction of the plant should begin within the next four or five months. In the meantime, actual organization is being worked out, timber is being produced and the company's forestry plan is being perfected.

Mr. Gamble, who has resided in Savannah since 1929 when he became associated with the Union Bag and Paper Corporation, has been connected with paper manufacture all his life. He began his career with the North Ireland Paper Company in North Ireland, in 1904 and subsequently was associated with the Wayagamack Paper Company in Canada and the Crown Zellerbach organization in San Francisco.

In making the announcement concerning Mr. Gamble, Mr. Allen also stated that R. G. Seip, of Fernandina, has been selected as chief engineer. Mr. Seip and his associates are at present actively engaged in drawing the preliminary plans for the new mill.

◆

CROWN WILLAMETTE HONORS OLD-TIMERS

Service pins were awarded to 138 employees of the Crown Willamette Paper Company division of the Crown Zellerbach Corporation at a banquet in Camas, Washington, on February 9.

J. D. Zellerbach, president of Crown Zellerbach Corporation, congratulates H. E. Jones, log scaler of the Crown Willamette Div., on the occasion of his completing 45 years of service with the paper company and predecessor companies. Left to right—J. E. Hanny, resident manager, Camas mill; J. D. Zellerbach, C-Z president; Albert Bankus, vice president of C-Z; H. E. Jones, and Frank Youngman, C-Z vice president.

J. D. Zellerbach, president of C-Z, made the presentations.

Honored guest at the affair was Henry E. Jones of Oregon City, Oregon, who received his 45-year pin. Mr. Jones, known as the dean of log scalers on the Columbia River, started work in 1895 with the old Willamette Pulp and Paper Company in West Linn, Oregon. In 1907 he was employed by the Crown Paper Company, Oregon City, and since 1914 he has been scaling logs.

Other old-timers to receive pins were Bert Rankin of Cathlamet, Washington, 40 years; John Christopher of Camas and Ed. Olson of Cathlamet, 35 years; Hugh D. Kennedy, William Morris and Tom Poulas of Camas, 30 years; Tom Tucker of Cathlamet, 30 years, and E. P. Barthelemy, G. M. Julien and Oscar Stucki, all of Camas, 25 years.

Awards were given for service ranging from five to forty-five years with the company and its predecessor companies. Service emblems are awarded to C-Z employees every five years. Seventy-five per cent of the 2,000 employees of the Camas mill have been with the company five years or longer. Of the Crown Zellerbach Corporation's 8,000 employees 55 per cent have seen five or more years of service.

◆

CELEBRATE BIRTH OF PRINTING AND U. S. PAPERMAKING

Three important anniversaries—the 500th year of printing from movable type, the 300th year of American printing, and the 250th anniversary of American papermaking—are being observed in the year 1940.

The 500th anniversary of printing is being publicized by printers in a variety of ways. A unique contribution to this anniversary was issued by the Graham Paper Company of St. Louis, Missouri, in the form of a window and counter display. The display is printed in five colors, is 28 inches by 44 inches and graphically illustrates the growth of printing, pointing out to the public that "printing is the gateway to new business." The United States Government has issued a commemorative stamp in honor of the 300th anniversary of American printing.

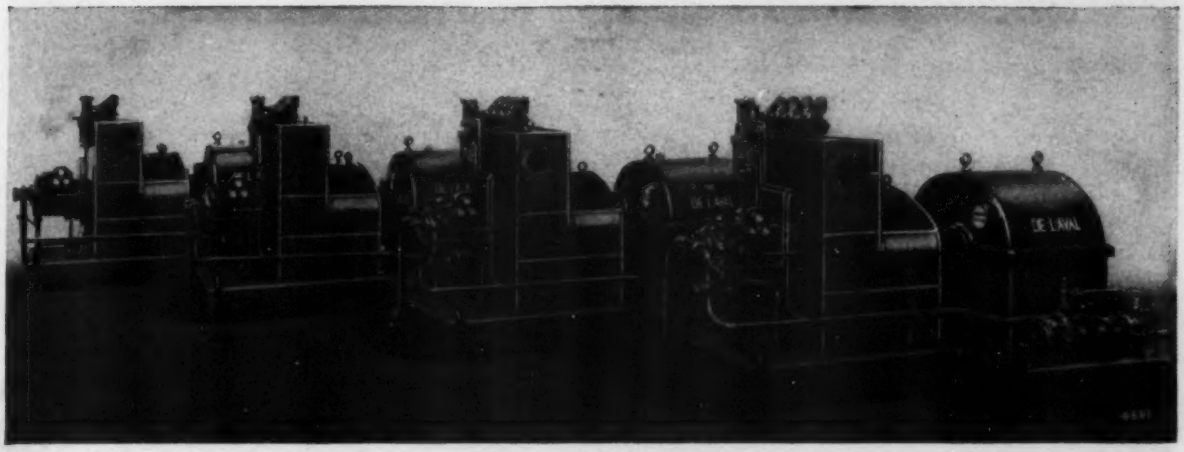
As a token of regard for the founders of the first American paper mill 250 years ago and as a reminder that "paper promotes economy and culture" a stamp commemorating the 250th anniversary of American papermaking has been produced. This stamp, produced by William Bond Wheelwright of Cambridge, Massachusetts, actually depicts the process as carried on both at the first and the last of American hand-made paper mills. The illustration on the stamp is reproduced from a photograph of the model in the Paper Museum of Crane and Company, Dalton, Massachusetts. The miniature equipment, made to scale by Dard Hunter, who designed the ensemble, is faithful to the last degree.

◆

RAYONIER, INC. ANNOUNCES PULP PRICES

Rayonier, Inc., with headquarters in San Francisco, has announced prices for the second quarter of 1940 on its dissolving types of pulps.

These prices are: Rayacete, $100; Purayonier, $100; Hicolor, $80; Rayonier, $75, and Cellunier, $70. These prices are effective from April 1 to June 30, 1940, inclusive per ton of two thousand pounds air dry basis (10 per cent moisture), Atlantic seaboard ports of call, in specified sheet form.



● Four six-stage De Laval turbines with double helical gears for driving induced draft fans; exhaust to feed heaters at 60 lb. absolute; 1200 hp. each at 4750 r.p.m. turbine speed and 1080 r.p.m. fan speed.

for Variable Speed Drives use DE LAVAL TURBINES

● One of three ten-stage De Laval turbines for driving boiler feed pumps in the same station; exhaust to feed heaters at 8 lb. absolute; 1250 hp. each at 3500 r.p.m.

VARIABLE speed drive is frequently desirable, both because it results in better operation and because it saves a large amount of power.

This is particularly true with centrifugal pumps and fans. Because of the drooping pressure characteristic at constant speed, such machines develop the highest pressure at minimum flow and the lowest pressure at maximum flow, just the opposite of what is wanted, which makes regulation difficult and, at the same time, is excessively wasteful of power.

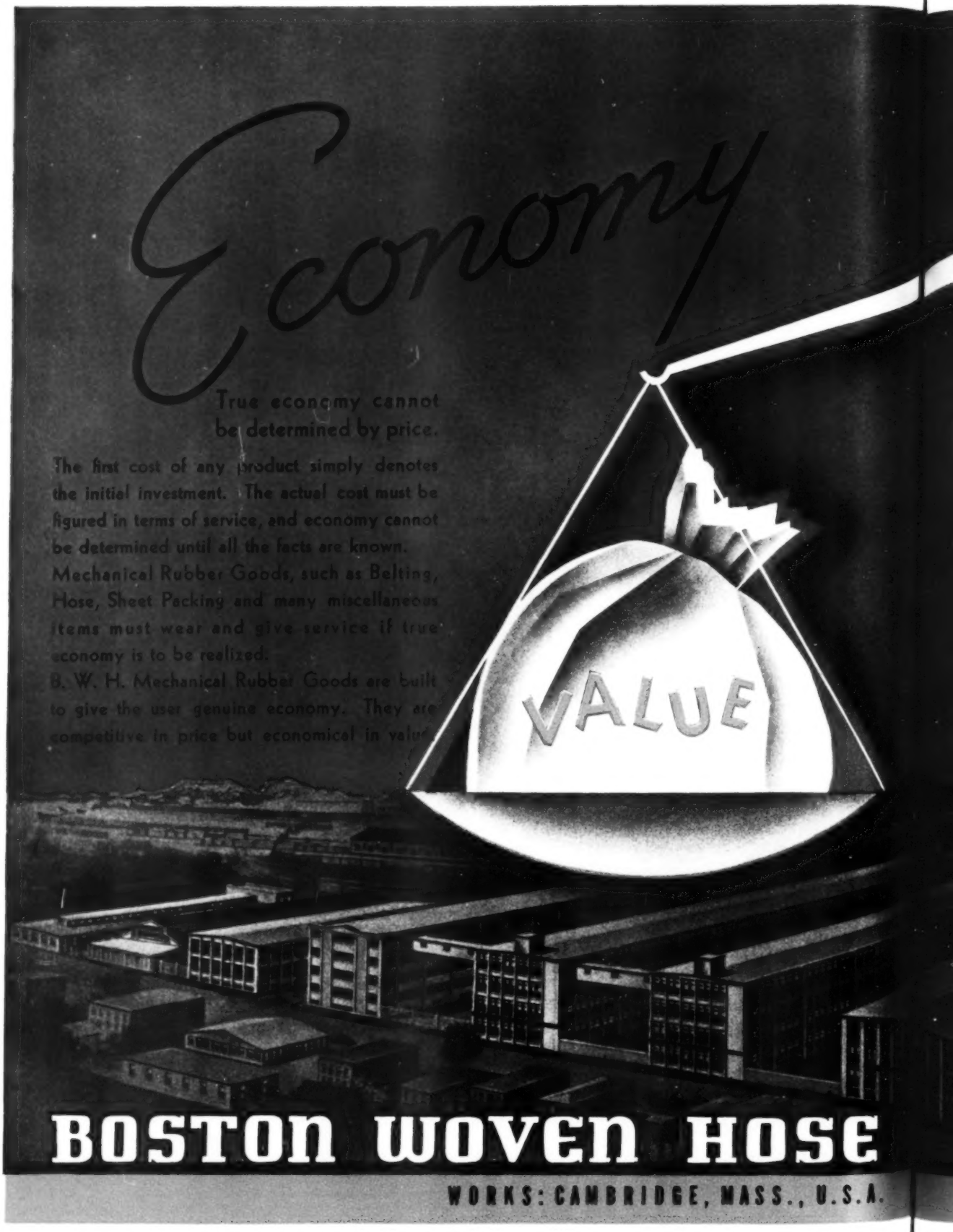
The speed of a De Laval turbine is, on the other hand, readily controlled, either by hand or automatically, and with multiple inlet valves and pressure staging, the efficiency is well sustained over a wide range of speeds.

Examples of economies gained by the use of modern De Laval turbines in variable speed, superposed, back pressure, bleeder, mixed flow and condensing service are given in Leaflet E-1169, sent free.

3513

DE LAVAL *Steam Turbine Co.*
TRENTON, N. J.

MANUFACTURERS OF STEAM TURBINES, PUMPS, CENTRIFUGAL, PROPELLER, ROTARY DISPLACEMENT, CENTRIFUGAL BLOWERS AND COMPRESSORS, WORM GEARS, HELICAL GEARS, HYDRAULIC TURBINES AND FLEXIBLE COUPLINGS — SEE DISTRICT OFFICE FOR DE LAVAL WATER EXHAUST TURBINE SYSTEM


Economy
True economy cannot be determined by price.
The first cost of any product simply denotes the initial investment. The actual cost must be figured in terms of service, and economy cannot be determined until all the facts are known.
Mechanical Rubber Goods, such as Belting, Hose, Sheet Packing and many miscellaneous items must wear and give service if true economy is to be realized.
B. W. H. Mechanical Rubber Goods are built to give the user genuine economy. They are competitive in price but economical in value
VALUE
BOSTON WOVEN HOSE
WORKS: CAMBRIDGE, MASS., U.S.A.

PRICE
& RUBBER COMPANY
POSTAL ADDRESS: BOX 1071, BOSTON, MASS., U. S. A.

BRIEFS

▸▸▸ THE McNARY RESOLUTION in the United States Senate, calling for a reopening of the investigation by the Tariff Commission of the pulpwood industry and foreign competition, is in the hands of the Senate Finance Committee which will not recommend the resolution for adoption unless the Tariff Commission changes its former position that the war prevents a proper investigation of foreign conditions.

◆

▸▸▸ THE UNBLEACHED SULPHITE MILL of the Eastern Corporation at Orono, Maine, went into production on February 19 with a daily output of about fifty tons. The mill has acquired an ample backlog of orders insuring steady production for many months ahead. The paper machines will not be operated at the present time.

◆

▸▸▸ THE PEJEPSCOT PAPER COMPANY, whose Topham and Brunswick mills in Maine are running at near capacity, is about to emerge from re-organization under the well-known 77-B amendment. Coincidental with the filing of the reorganization plan the company also announced that it had net sales of $1,980,285, which covered its interest requirements, after all deductions, by 1.6 times. In its statement the company shows current assets of $665,139 and current liabilities of $396,917.

◆

▸▸▸ FINAL DISTRIBUTION OF ASSETS in the old Cushno Paper Company, which formerly owned and operated the mills now housing the Kennebec Pulp and Paper Company at Kennebec, Maine, will soon be made. These assets amounted to approximately $90,000 and will be divided between bondholders of the 1908 Cushno company, later the Kennebec Paper Company, and the 1936 Cushno concern which took over when the latter two went into bankruptcy.

◆

▸▸▸ IT IS ILLEGAL for proprietors of public eating and drinking places in Venezuela, South America, to serve drinks—hard or soft—in any but single-service paper cups, according to a national law passed recently.

▸▸▸ AN INCREASE OF $5 per ton in the price of wood cellulose bracket pulp, used as the raw material base for making rayon yarn, Cellophane, and allied products in Canada, is announced for the second quarter by the Canadian International Paper Company. Prices range from $70 to $80 per ton, depending on quality.

◆

▸▸▸ AN INVESTIGATION of the zone where careful management of a second growth Southern pine has resulted in the rejuvenation of the lumber industry and the start of the newsprint industry, will be made by E. C. Manning, chief forester of the province of British Columbia. From his report, British Columbia hopes to learn something in dealing with its own problem of forest management, it was reported.

◆

▸▸▸ WATCHMEN ARE AS MUCH ENGAGED in the production of goods for interstate commerce as those operating the production machinery, a Federal judge in North Carolina has ruled in a contempt proceeding in the first instance where the question was raised in court of paying a watchman the minimum wage and overtime rates prescribed by the Fair Labor Standards Act (Federal Wage and Hour Law).

◆

▸▸▸ AN EXPANSION PROGRAM has been planned for the Crystal Tissue Company, Middletown, Ohio. Improvements will be made to the water system and the efficiency of the boiler plant will be raised. These improvements, plus many smaller ones, represent an investment of about $60,000.

◆

▸▸▸ ERECTION OF A NEW LABORATORY at Powell River, B. C., has been started for the Powell River Company. Cost is estimated at $45,000.

◆

▸▸▸ THE PLANT CAPACITY of Canada Glazed Papers, Ltd., Toronto, manufacturers of coated papers will be expanded about thirty per cent at their present location in Toronto.

◆

▸▸▸ A NEW CHEMICALLY-TREATED PAPER which changes from white to deep blue in color when the temperature rises above a certain point, has been introduced by the Nashua Gummed and Coated Paper Company, Nashua, New Hampshire. The paper, designed originally for use in laundries, is finding wide application wherever efficiency depends upon a limit of temperature.

If you can increase defibering and improve flocculation and formation in your beaters, you've not only made possible worthwhile savings in time and power, but you've saved power in subsequent jordaning.

MAGNUS BEATEX

or one of a number of other materials especially compounded for this particular purpose (in view of the requirements of different kinds of stock) will give you materially improved beater performance. These materials make the water penetrate and open up the fibre bundles much more speedily and thoroughly. Formation is improved. Retention of filler and size is improved. When scrap paper is used, particularly containing wax or asphalt, these Magnus materials disperse wax and other "spot formers," keeping them so finely divided that this trouble is ended.

These materials are neutral, non-toxic and freely water-soluble in acid, neutral or alkaline solutions. They do not affect the pH of the stock and are completely compatible with any of the materials used in furnish or sizing.

GET THESE PERFORMANCE RECORDS

We have recently compiled a series of performance reports from paper mills making a wide variety of stocks, showing what Magnus Beatex or other wetting agents have done to improve Beater operations.

Ask for Your Copy

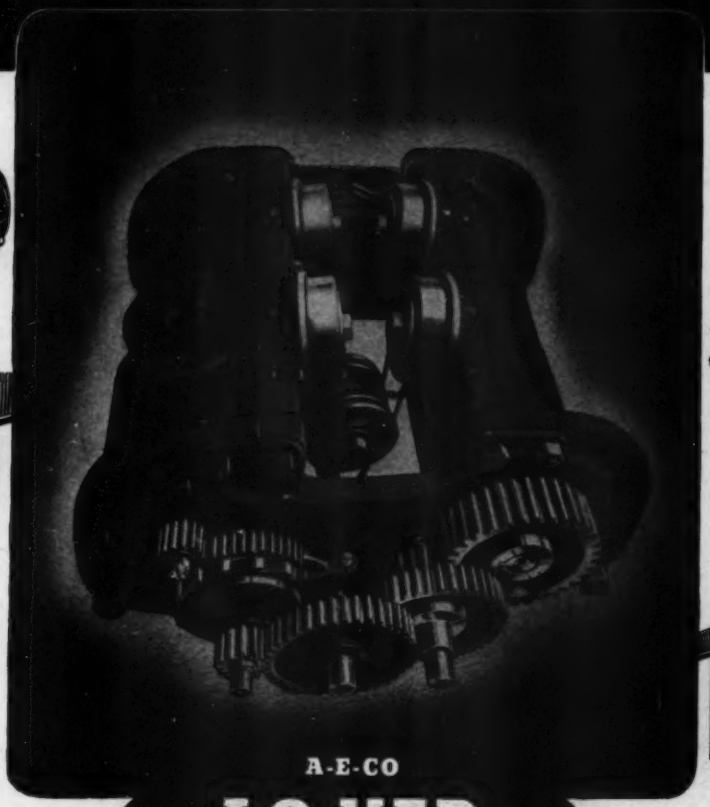
MAGNUS CHEMICAL COMPANY

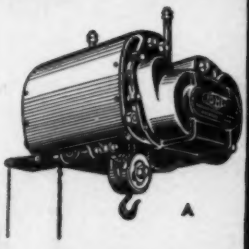
Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

192 South Avenue Garwood, N. J.

Magnus CLEANERS

GET the hoist with every *worthwhile* feature

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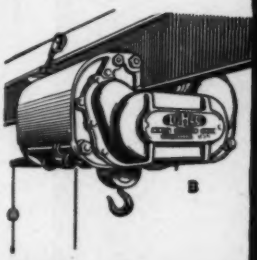
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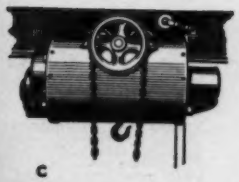
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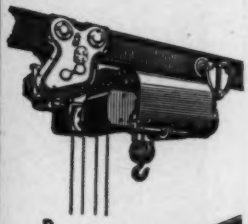
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E

THERE'S A LO-HED ELECTRIC HOIST FOR EVERY PURPOSE

A—Bolt Suspension Type.
B—Plain Trolley Type.
C—Hand-Geared Type.
D—Motor Driven Trolley Type.
E—Cab-Controlled Type.

CAPACITIES FROM ½ to 12 TONS

A-E-CO

LO-HED *Time-tested* HOISTS

When you buy an electric hoist you want all the *worthwhile* features a hoist should have. Here is the way to get them: specify LO-HED. Lo-Hed construction includes *every* feature that the test of time has proved desirable. A-E-CO engineers have successfully resisted every temptation to add gadgets which would only have provided mere "talking points" or "improvements" which would not better performance, life, efficiency, or maintenance. Note in the open-view of the Lo-Hed Hoist the logical arrangement of the hook between the drum and motor for minimum headroom. And these time-tested features: heavy duty hoist motor, automatic lowering brake, automatic bearings, stub shafts, grooved drum, plow-steel cable, 100% positive automatic stop, fire, dust and moisture-proof controller. (Construction varies slightly for classes of Lo-Heds.) • Investigate Lo-Hed time-tested construction. Write today for the complete Lo-Hed Catalog, shown below.

AMERICAN ENGINEERING COMPANY

2444 ARAMINGO AVENUE, PHILADELPHIA, PA.

OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER

Classified phone directories list the local A-E-CO representative in principal cities. Call him in... or write us for the hoist catalog.

MAIL THIS COUPON NOW

AMERICAN ENGINEERING COMPANY
2444 Aramingo Avenue, Philadelphia, Pa.

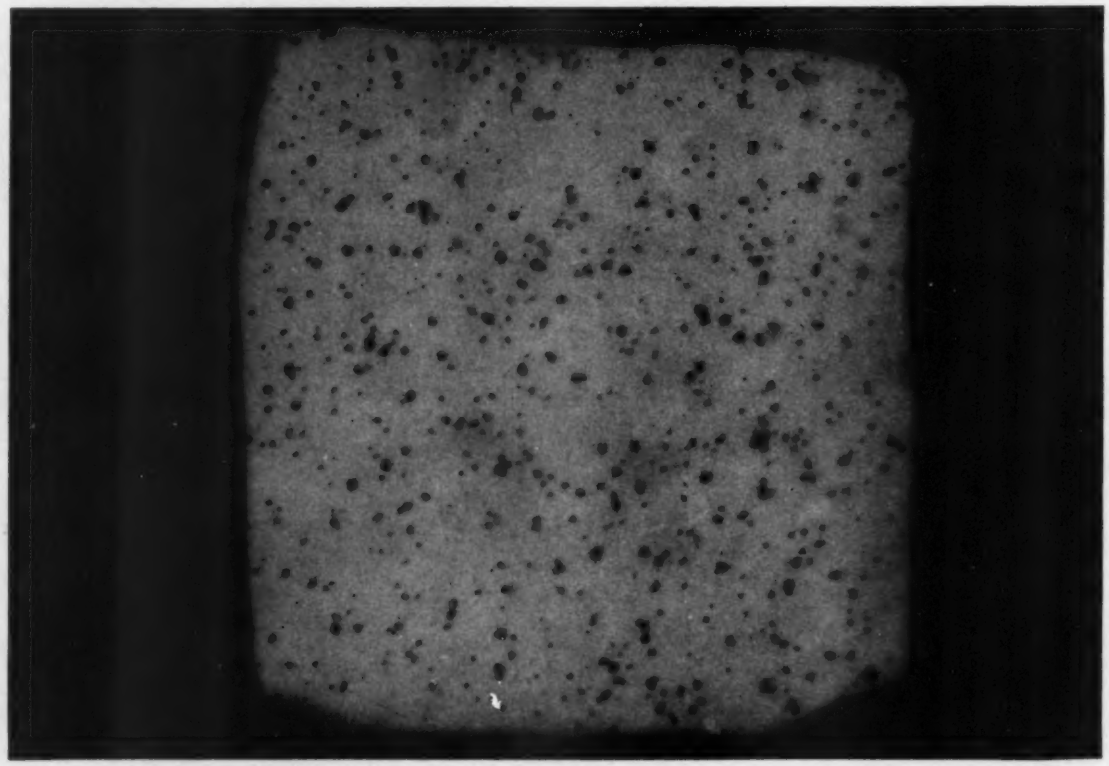
☐ Please send me your 26 page complete catalog of Lo-Hed Hoists.
☐ Ask your representative to call.

Name_____
Company_____
Street Address_____
City_____ State_____
(Please print plainly)

RAYOX

PURE TITANIUM DIOXIDE

showing extremely fine particle size



This photograph shows one opening of a 325 mesh screen magnified 4,000 times. The opening is approximately 1/100,000th of a square inch. The dark spots are Rayox particles shown in comparison to the size of this extremely fine opening

R. T. VANDERBILT CO., INC • 230 PARK AVENUE, NEW YORK

Editorial ★ ★ ★

TELLING THEM NOW

▶▶▶ LIFE HAS BEEN MADE EASIER and far more pleasant for most of us because of man's desire to be comfortable, to do things, and to go places. These desires have brought about practically all of the inventions of all time. In recent years, inventions have been most prolific and far-reaching. The surprising thing really is the newness of so many of the developments which are part of the every day life of nearly everyone. So recent are they that many of the pioneers who contributed to these very developments are yet with us and are continuing to do things.

How fitting, therefore, it was for the National Association of Manufacturers, in observance of the 150th anniversary of the founding of the American patent system, to institute a program of honoring these men. Scientific organizations and business groups were invited last July to nominate persons whom they believed had enhanced living standards and created employment through their patented discoveries and inventions during the last twenty-five years. The result—more than 1,000 nominees, almost 500 of whom were picked to receive modern pioneer scrolls.

It is pleasing to know that of these men so honored, some are associated with the pulp and paper industry and that others are indirectly related to it.

Congratulations to these men as well as to all others who are sharing honors with them.

THE 1940 CONVENTION

▶▶▶ THE PAPER AND PULP BUSINESS in this country is on the up and up. Nothing proves that statement so clearly as the activities of the annual convention in New York last month.

It was probably the largest convention on record and the hardest working one. As to attendance, an index is found in the fact that the Salesmen's Association luncheon was attended by over 1,200 pulp and paper mill men, converters, and merchants. This was the largest attendance ever registered. At the Salesmen's Association luncheon, two keynote, informative and outstanding addresses were made.

The first by D. Clark Everest stressed the point that paper prices were "lagging behind pulp prices." In other words, pulp prices were advancing faster than paper prices. Then, he reamed home the basic fact that paper prices must be revised upward to meet the replacement costs of wood pulp which were higher and going higher weekly. He also counselled the industry not only to refrain from speculative commitments, but laid it down as one of the duties of salesmen and sales executives that they should advise their customers to refrain from speculative buying to the end that the price structure of the industry might ride through this turbulent period on a comparatively even keel.

Right here, we cannot refrain from passing out our commendation for the restraint that the mills have shown in handling their pricing thus far. There is no instance, anywhere, in the industry of anything suggesting any profiteering. On the contrary, the evident determination of the producers in the industry is to maintain prices on the basis of reasonable profits only. That policy, as Mr. Everest said, will, with the intelligent co-operation of the merchants and converters, help to pull all divisions through this period, so that when the war is finally ended and the peace revisions are made, no one can be hurt to any vital degree.

Dr. Kingdon, the guest speaker at the luncheon, glued every hearer to his seat. His was the most masterly address we have ever had the pleasure of listening to in the past twenty-five years of attendance at the annual conventions. It was a fine economic analysis of distinction and conviction. He helped every man present to a clearer understanding of the economic conditions in this country and in the world. He left no one in doubt as to the wisdom of the United States keeping out of the European War. For, after the carnage is all over and the remnants of the nations come staggering up out of the darkness and despair of the war, the one bright light of hope for the future should be the humanitarianism and co-operation of the United States of America, the strongest, richest, most powerful nation on earth. America must prepare to become the leader in the reconstruction of the world. Dr. Kingdon's address should be in the hands of every American. The demand immediately after the luncheon for copies swamped the secretary of the Salesmen's Association.

In all, the convention was a constructive one. From it, should flow actions and sequences of inestimable benefit to the American paper industry.

INDUSTRIAL LEADERSHIP

▶▶▶ AT A RECENT MEETING of the Society of Chemical Industry in New York, some very interesting observations were presented on the subject "The Executive and the Technologist." Mr. William B. Bell, president of the American Cyanamid Company, and Dr. E. C. Williams, director of research and vice president of the Shell Development Company, were the spokesmen.

In their comments, it was revealed that complete understanding between top executives and research leaders is most necessary. It also was brought out that, while there is a trend toward bringing technical men into leading executive positions, there will be an interim during which the more traditional type of executive and research leader will have to make special effort to get together mentally. Then, too, it was stated that the successful executive devotes much attention to understanding the basic processes of his industry, and the research leader usually appreciates the problems and difficulties of executive control. Other comments made it clear, however, that there are plenty of possibilities for misunderstanding arising from the different backgrounds of the executive and research type and the way they work.

Capital, science (or technology) and labor were enumerated as the three main pillars of modern technological industry; and it was suggested that, if these three can be properly meshed by executive skill into a smoothly working whole, prosperity and safety alike are on a sound foundation.

Probably the keynote to all of the remarks was: "Any industry which neglects to take account of what is going on in the research laboratories is on the road to decay." This remark prompts the suggestion to read carefully "Budgeting Research and Development," the leading feature article of this issue. There is much in the article for technologist and executive alike. Do not miss it.

CURRENT THOUGHT

▶▶▶ FROM FRANK E. WATTS, editor of *Electrical Dealer* I have been privileged to read a letter recently received by a well-known manufacturer of electric ranges. This letter so emphasizes a basic fundamental in selling that I wish to pass it on to you. Here it is:

"Whether or not consumer reaction is important to you, I should like to thank you for my electric range.

"It is a 1937 model with deepwell cooker, which I bought in 1938. We could not really afford a stove of any kind, so of course we could not afford any but the best. I have used this range for two years, and have used it hard. I do my own baking, bread and all, and my family is very fond of oven dinners, so the oven is used almost every day. And still it bakes evenly. I can fill every side with cookie sheets, and all the cookies are done at the same time and are all the same shade of brown on the bottom.

"There is no reason for this letter—except, perhaps, that tomorrow is Thanksgiving, and I have wanted for months to say thank you to the people who built my stove."

Note especially that this writer said: *"We could not really afford a stove of any kind, so of course we could not afford any but the best."* There is a wise buyer—and a real hunch for the wise seller. For four reasons always insist upon selling the best: (a) for the benefit of the consumer, (b) for the benefit to yourself that comes through having a satisfied customer, (c) for the benefit of the manufacturer, (d) for the higher markup that the best invariably carries.

Regardless of whether the product be an electric appliance, a fountain pen, a suit of clothing, or whatnot—the cheap product will most surely be found to be the most expensive in the long run. Too many people buy on price. Too many people sell on price. Oddly enough price is a buying and selling fetish more characteristic of Americans than of many foreign peoples. Go into the kitchens of the foreign-born, in the homes of people who have been raised and schooled in old-world thrift, and there you will find quality furniture, quality curtains, quality ranges and refrigerators.

Much might be done to promote the buying and selling of quality merchandise if we could but get a broader perspective of the service we are either selling or buying. The papermaker doesn't sell so much pulp rolled out into thin sheets—he sells the transmission of thought, expressed in either words or pictures. The jeweler doesn't sell stones dug from the ground—he sells love, romance, loyalty, beauty, rapture, ecstasy, tenderness. The automobile maker does sell an assembly of steel, wood, glass and textiles—but it is really transportation. The manufacturers and dealers of electric appliances don't sell washing machines, they

A BROADER PERSPECTIVE

◆

WILLIAM SIBLEY

sell freedom from the drudgery of laundry work; they don't sell electric ranges, they sell the comfort of cool kitchens and better cooked foods; they don't sell electric refrigerators, they sell food preservation, cleanliness and health. The manufacturers of the porcelain enamel which covers such appliances don't sell "frit" alone—they sell enduring beauty, pride of ownership, sanitation. People who make vacuum cleaners, light bulbs, or radios, don't merely market such products—they sell banishment of dirty brooms and dustpans, youth, smooth hands, straight backs, better sight for children, joy and education. Those who buy or sell the best of whatever it may be use and sell the things which do much to eliminate furrowed brows, wrinkled faces, stooped shoulders and backaches. That's the true meaning of selling the best rather than selling a price tag.

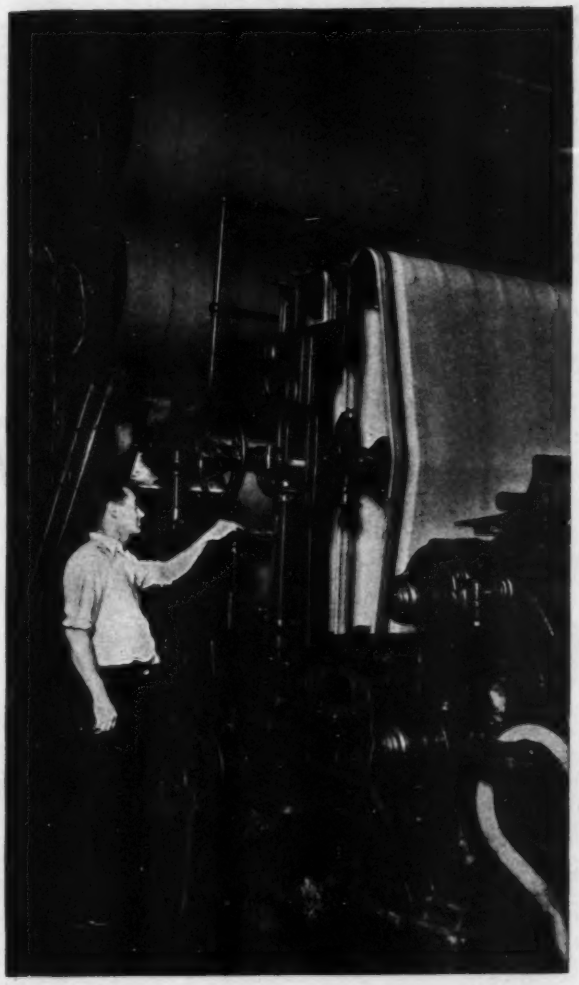
A "Why-Should-I-Care" Personality

Some fellows seem to be able to get away with almost anything. There is one whom I know that does. Morals just don't mean a thing to him. He is unmarried, yet he lives openly with a woman he is infatuated with—and doesn't give a tinker's dam what other citizens say or think. He has absolutely no regard for truth or law.

The duties of the so-called good citizen are just so much sheer bunk so far as he is concerned. He doesn't vote at either the primaries or the general election. He never thinks of paying a bill. We have seen him take a two-dollar taxi ride without giving the driver so much as a pleasant look. And he gets away with it, too, because the driver only looks at him, then mutters something silly.

He neglects his appearance frightfully. He is so insolent he would let the house burn down without even so much as thinking of turning in an alarm. The telephone could ring continuously yet he'd never bother to answer it. Even on such a subject as the liquor question no one knows exactly where he stands, because one minute he is dry and the next minute he is wet. But there is this much to say for him: in spite of his faults he comes of a very good family. *He is our new baby.*

▶▶▶ BURTON KINGSLEY ONCE SAID: "A woman lacking true culture is said to betray by her conversation a mind of narrow compass, bounded on the north by her servants, on the east by her children, on the south by her ailments (including diet) and on the west by her clothes." In rebuttal, I would say that the culture of a man may be judged by how successfully he keeps his conversation off the subjects of his work—bridge—liquor—women.



MORE SPEED WITH LESS BROKE

The speed of any paper machine is determined by the condition of the web at the wet end. Unless the excess water has been extracted thoroughly and uniformly by the felt and press, breakage is bound to occur. The higher the speed the greater the "broke" and the lower the output. Hence the importance of the wet felts.

Hamilton Felts are built for high speed. The experience of more than eighty years governs the selection and weaving of the fleeces that enter into their manufacture. Hamilton Felts are uniform and consequently they remove water uniformly They are unusually strong. This combination of strength and uniformity makes them last longer

From the thinnest tissue to the heaviest board, there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Miami Woolen Mills

Hamilton Felts

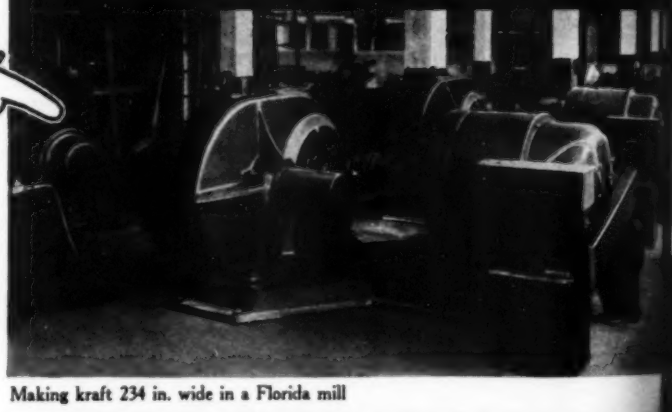
Established 1858

They

G-E DEVELOPMENTS FOR THE PAPER INDUSTRY

1. Supercalender drives of unusual size
2. Record-size grinder motors
3. Turbines with wide-range electric governors
4. Progressive draw adjustment
5. Variable-voltage winder drives
6. Sectional paper-machine drives
7. Drive to maintain constant transfer-belt tension

SECTIONAL PAPER MACHINE DRIVE



D-c Job

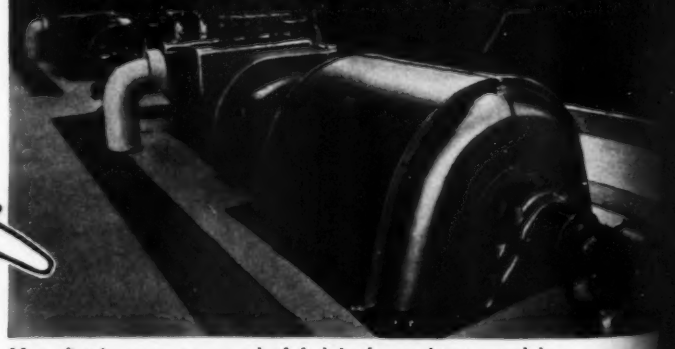
Making kraft 234 in. wide in a Florida mill

SPLASHPROOF CONVEYOR DRIVE

A-c Job

Gear-motor starts logs along at a kraft mill in Georgia

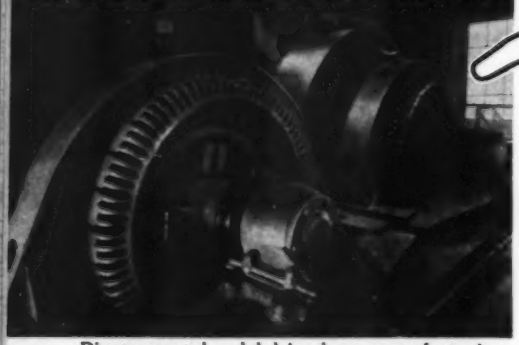
TURBINE-GENERATORS FOR POWER



A-c Job

More electric power per pound of fuel is the consistent record in turbine-generator progress. Power room of a Florida kraft mill pictured

SYNCHRONOUS MOTORS FOR CHIPPERS



A-c Job

Direct-connected and helping boost power-factor in Georgia pulp mill

GENERAL

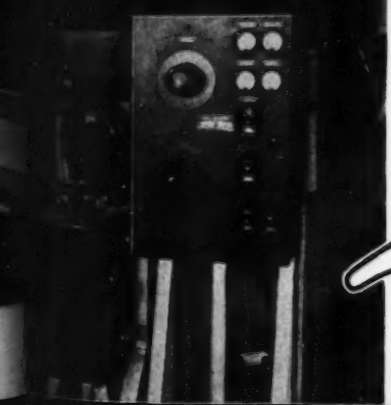
Put a *Wallop* *with Precision* into Papermaking

G-E equipments assure flexible ranges of speed, high speed, and exact control of complex processes

HERE are representative G-E electric equipments that assure both *wallop* and hair-line *precision* in the drive and control jobs of high-speed and fine papermaking. Two thousand fpm machines must have a drive with plenty of punch and flexibility—so must modern machines that operate at lower speeds. Differences in load characteristics introduce knotty problems in synchronizing the entire machine.

General Electric provides equipments—electric "systems"—that successfully answer these and all the other problems to which electricity can be summoned—for all kinds of paper machines ranging from thickest board to thinnest tissue. You'll find G-E drives on the highest-speed machines—in the first cigarette paper mill in the United States—in the largest Northern newsprint mills, and in the first Southern newsprint mill. Developed in co-operation with mill and machinery manufacturers, General Electric equipments have been prominent in making possible *more* paper and *better* paper. General Electric Co., Schenectady, N. Y.

CONSTANT-TENSION WINDER CONTROL

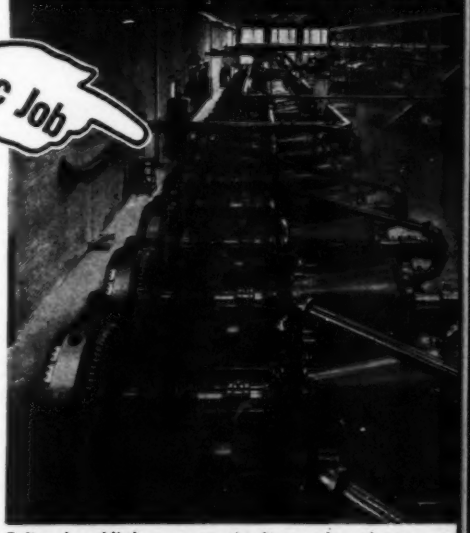


D-c Job

Operator's station for control of high-speed adjustable-voltage winder. In a new Southern paper mill

RECORD ROW OF JORDAN DRIVES

A-c Job



Believed world's largest operating lineup of synchronous motors—a Georgia mill

HIGH-SPEED SUPERCALENDER DRIVE

D-c Job

Adjustable-speed motor drives "super" in Midwestern coated-paper mill

GE

ELECTRIC

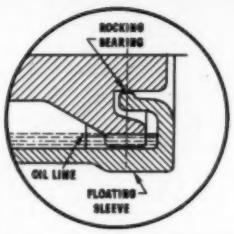
WEST COAST HEMLOCK PULP

HARVESTING of mature virgin timber for lumber and Weyerhaeuser bleached and unbleached sulphite pulp requires the planned projection of new track for the logging railroad.

PULP DIVISION ✦ WEYERHAEUSER TIMBER COMPANY

FAST'S COUPLINGS

Self aligning



This illustration shows Fast's construction. No perishable materials are necessary to make this coupling dust and moisture proof. No attention but oiling is required.

"The best is the cheapest" applies with particular force to Fast's Couplings. Long life with no service interruptions means lower cost per year, and savings for the user. To assure these benefits in your mill, specify genuine Fast's Couplings on the machinery you purchase.

KOPPERS COMPANY · BARTLETT HAYWARD DIVISION · BALTIMORE, MARYLAND

● **OTHER KOPPERS PRODUCTS FOR THE PAPER FIELD:** Coal . . . Coke . . . Treated Timber . . . Built-up Roofs . . . Waterproofing . . . Tarmac Paving . . . American Hammered Piston Rings . . . Materials Handling Systems . . . D-H-S Bronze Castings.

a KOPPERS product

READ WHAT USERS SAY ABOUT THIS *New* PRESSURE REDUCING VALVE

★ *Slightest variation in pressure would damage product*

"We buy Streamlined Valves because we want valves that will always be on the job. Slightest variation in the reduced pressure would cause considerable changes to occur in our process. Our first 1000 Valve has been in use for more than 4 years and it has always been on the job."—Case No. 136.

★ *Many 1000 Valves in use—have never had to service one—*

"My job covers all our plants. If I put in equipment that demanded a lot of attention, I would never be done. I can honestly say—that I have never been called out in any plant on these 1000's, and they are operating exactly as when they were first installed."—Case No. 218.

★ *Trouble for years—but now our troubles are over—*

"We had trouble for years trying to hold a steady steam pressure in our Autoclave. Other valves would not do the job. Your 1000 Regulator has been on for over a year now, and we never hear from the operator on this job. Our troubles are over."—Case No. 133.

★ *Dozens in use—yet not one dime spent for repair parts in four years—*

"We have dozens of these Streamline Regulators in use, yet over a four year period we have not spent one dime for repair parts. We can put one of these Regulators in an out of the way place and forget about its being there."—Case No. 143.

★ *Wanted noiseless operation—and tight closure—got both—*

"We wanted a Regulator that would be noiseless in operation and close tight. In using your Streamlined Valve we sure did get both. We are sold on this valve. Has never been adjusted. Was installed exactly as we received it from the factory and it has been doing a fine job."—Case No. 195.

★ *Valves are honeys—so good we forget them—*

"The Cash Standard 1000 Valves are honeys. The fact that we don't ever have any trouble with the ones we have installed tends to make us forget them. I'm going to make it my business to order more of them in the future."—Case No. 180.

Straight Line FLOW ELIMINATES TURBULENCE.... .... *Gets* HIGHEST VALVE CAPACITY

From inlet to outlet, the fluid flows through this valve in a straight line — a streamline — almost as though there was a pipe running through the valve housing for the fluid to flow through. There is no detour around a dividing wall—the direction of flow is not changed at right angles because of a seat wall—also, the flow is not broken up by valve stems, springs, or other parts. The net result is NO TURBULENCE, hence MORE CAPACITY.

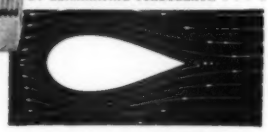
CASH STANDARD *Streamlined*

TYPE 1000 PRESSURE

REDUCING VALVE

... GIVES YOU UNUSUAL EFFICIENCY PROVIDED BY THE STRAIGHT LINE FLOW OF AIR-STEAM, WATER-OIL AND OTHER LIQUIDS AND GASES THROUGH THE VALVE

SHOWING HOW THIS VALVE INCREASES PERFORMANCE RESULTS BY ELIMINATING TURBULENCE ....



.... AND HOW YOU ELIMINATE THIS TURBULENCE

The high pressure entirely confined to the small inlet chamber (cross hatched section) makes this valve good for initial pressures up to 3000 lbs. The valve is furnished in sizes from ¼"x¼" up to 2"x2½", inclusive. For delivery pressures below atmosphere a special diaphragm spring arrangement is used.

Exactly suited for your service conditions . . .

You may select a CASH STANDARD Streamlined Valve exactly suited for your service conditions. Any combination of metals can be obtained for body, trim, valve seat, and seat ring. Handwheels for quick pressure adjustment also available.

Because of the streamlined flow, you are easily able to meet peak demand and yet hold the pressure constant at the same time. You get correct flow when you need it most. No turbulence is set up and therefore operation is smoother—you have no flow variation—you have constant, dependable action — you experience no spoilage results due to turbulence.

30-DAY TRIAL *Free* OFFER

Write for details on this special offer made to give you an opportunity to find new ways to save money.

SEND FOR BULLETIN 1000

NOW WITH THIS *New* SIMPLE DESIGN YOU GET CAPACITY AND CLOSE REDUCED PRESSURE TOO WITH MINIMUM MECHANISM

This modern Streamlined Valve has stopped trouble in many plants. It stops trouble because it is so simple—has no complicated parts to get out of order—no small ports or passages to clog up — nothing to keep it from working dependably.

From inlet to outlet, the fluid flows through this valve in a straight line—almost as though there was a pipe running through the valve housing for the fluid to flow through.

Because of the Streamlined flow, and the suction effect which gets the valve open extra wide—you are easily able to meet peak demand and yet hold the pressure constant at the same time. In short, you get high capacity flow when you need it most.

Every Streamlined Valve gets not only a pressure test for leaks before leaving our factory, but it is also operated—made to work under the identical pressure conditions stated on your purchase order—so it will be sure to *fit your job*—sure to work as you want it to work. Minimum mechanism means lowest maintenance cost—you get many important savings, such as elimination of the costs for tearing down, cleaning, and freeing-up parts.

Long service is a feature but when the time does finally come that replacement parts are needed, you will find them inexpensive and you can install them in your own plant yourself.

A. W. CASH COMPANY

DECATUR, ILLINOIS

CASH STANDARD CONTROLS . . VALVES

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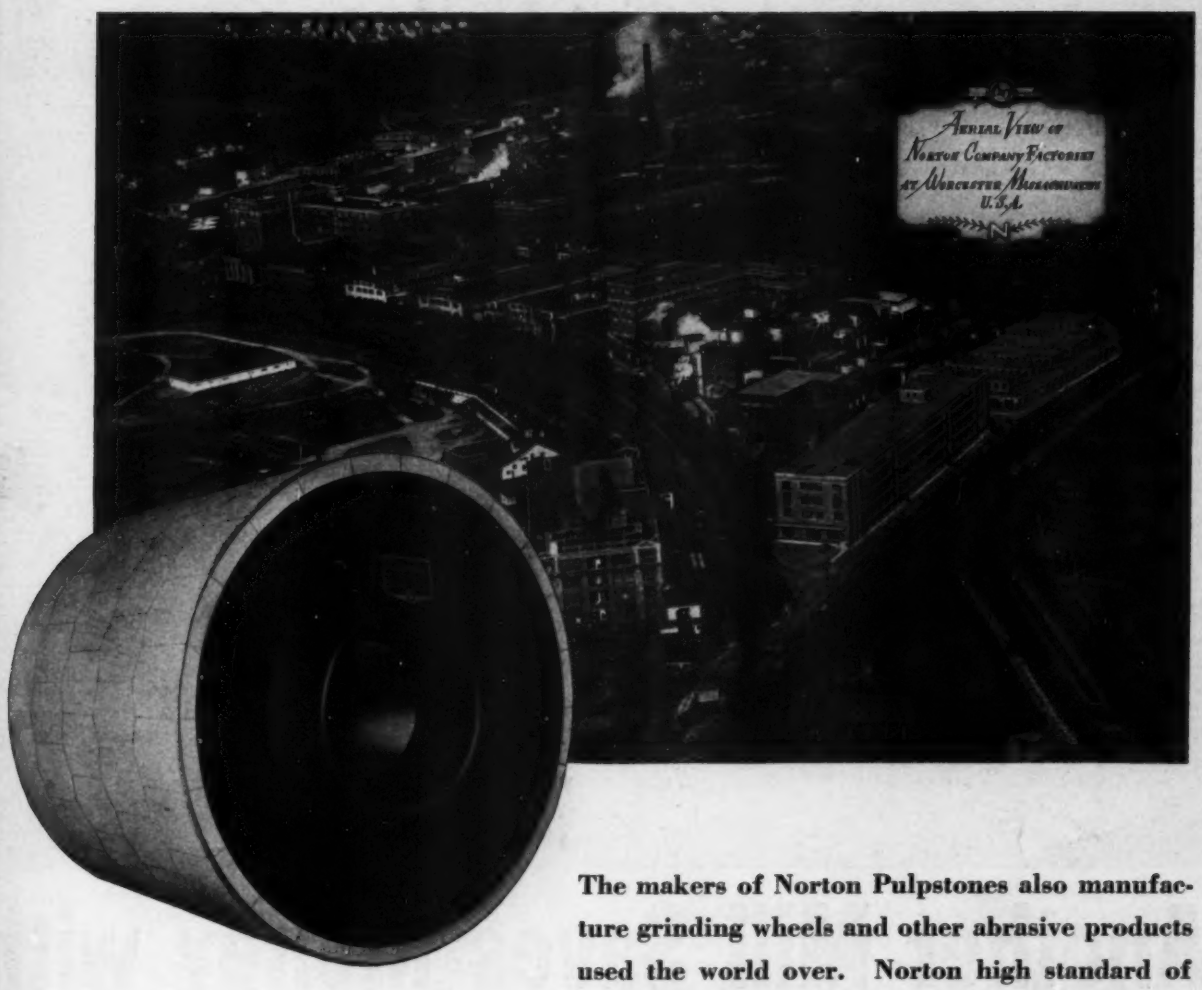

The makers of Norton Pulpstones also manufacture grinding wheels and other abrasive products used the world over. Norton high standard of quality has given Norton Abrasives wide recognition in countless fields of industry.

Pulp and paper manufacturers who know the economy of Norton Pulpstones also employ to advantage Norton Grinding Wheels for sharpening knives, grinding rolls and many other uses in the pulp and paper industry.

NORTON COMPANY
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C. C. HERITAGE

Budgeting Research and Development

▶▶▶ THE EARNINGS, RECORDS, AND GROWTH of those business enterprises which have invested reasonable sums in well-administered *research* and *development,* are well known. The extent of the facilities for research and development, of present activities and of past accomplishments is now recognized as one of the cardinal points to be investigated when investment in the securities of any enterprise is under consideration. It is, therefore, not the purpose of this presentation to argue the merit of or necessity for these activities. It is rather with the objective of attempting to formulate some fundamentals in the planning, budgeting and execution of *research* and *development* that this article is undertaken. The various phases of the matter will be discussed in the following sequence:

A. The place of research and development in the company organization.
B. The extent of the funds to be allocated to this activity.
C. The establishment of the development program.
D. The establishment of the development budget.
E. The execution of the program in line with the budget.

A. The Place of Research and Development in a Business Organization

A successful business meets among others these four conditions common to all:

1) The merchandise is of such quality as to be eminently suitable for the use to which it is put.

2) Prospective customers are so familiar with the merchandise that they will give it preference in their buying.

3) The value is attractive; that is, price and quality are in the proper relationship.

4) Manufacturing costs are such as to give an adequate profit margin.

In a business enterprise, the consumer controls the quality; the consumer and competitor control the price, and the quality and price together set the manufacturing process and the cost.

Over any small increment of time, two principal departments are required, sales and production. Assuming that standards of quality and cost have been established, production knows what it is to make and at what cost, and sales knows what it has to sell and at what price. Service departments such as purchasing, accounting, personnel contribute to the smooth running of the enterprise. The business of this organization is to make and sell standard goods at standard costs and prices and to deliver them when and where required. The job is basically a repetitive one.

It is characteristic of human nature to strive for improvement, for more perfect performance, for competitive advantage. The consumer expects improved quality and lowered prices each year; the competitor expects to increase his share of the business. Hence, over any substantial period of time, no business enterprise can be static without retrogression. It must be the responsibility of some unit in the enterprise to meet change with change, to beat the gun on changes, to anticipate the demands of the consumer and the performance of the competitor. This unit is *development,* basically a nonrepetitive job.

Development is used throughout this discussion as a generic term which encompasses *research* in its commonly accepted sense of laboratory investigations, and includes reduction of changes to profitable commercial practices, whether originating in the laboratory or elsewhere.

It is to be understood, therefore, that *development* may deal with all aspects of the business in prosecuting its responsibilities in meeting the changing order of things. Hence it is not to be controlled by either of the other prin-

cipal activities of selling or producing. It must have its own funds to administer, being neither a part of producing nor selling. Its expenditures may be either expense or capital depending upon the objective sought as is the case with the other two. Production makes capital expenditures as a matter of course. Likewise does Sales in the establishment of good will, of trade marked names by prolonged national advertising, although it is generally frowned upon to give these a dollar value in the financial statement as an asset. Therefore, *development* takes its place as a key department along with sales and production, with its own budget of expense and capital money.

B. The Extent of the Funds to be Allocated to Development

When an expenditure of funds is being contemplated for any purpose, three questions logically arise:

What is the need or justification?

What sum can be afforded?

What, specifically, will be obtained?

An attempt will be made to present certain answers to these questions in the remainder of this article.

1. What is the need or justification for development expenditures?

Development expenditures deal with the future of the enterprise and may therefore be broadly termed insurance. This insurance relates to the jobs of everyone connected with the enterprise for without jobs there is reduced purchasing power, to the earnings of the enterprise and to the capital itself, invested in the enterprise. In common with other forms of insurance, the administrator of an enterprise may wish to forego such expense, and abide by the consequences. No fault is to be found with this attitude provided it is honest and bona fide. How it usually works out is another matter. There is the management which maintains such a position outwardly but actually insists that its other department heads conduct development work simultaneously with carrying out their regular duties. Sometimes this works after a fashion but development expenditures thus buried are high, of unknown magnitude and usually produce mediocre results. There is the management which maintains that it is supporting development work, but actually has its technical staff so tangled up with control, trouble shooting and sales service that *development* gets lost in the shuffle. Then there is also the management which, not having provided development insurance, finds the business on fire and tries to use *development* as a fire-fighting organization. Occasionally this saves part of the enterprise if the fire is discovered in time.

2. What sum can be afforded for development expenditures?

This is a question to which the answer is different for every business enterprise. *Development* must be paid out of earnings and there are many other demands on this money. There is capital investment to be maintained against abnormal depreciation and obsolescence. Working capital is to be built up to a safe figure. Stock dividends are to be paid. Funds are to be ploughed back into the business through increased sales expense, improved and increased manufacturing facilities. An equitable distribution of earnings to meet these needs is an individual problem for each company.

Of no less importance in the decision concerning the extent of the funds to be allocated to *development* is the competitive condition of the enterprise. If the sales volume has been declining, if manufacturing costs have been rising, if gross margin has been narrowing and earnings decreasing, the diversion of a substantial portion of the remaining earnings to *development* is well justified.

In this connection, the size and nature of the enterprise also bears on the question, since a small business may find it necessary to divert a greater proportion of funds to development to make any reasonable headway, whereas a large enterprise will provide ample funds by allocating a much smaller proportion.

As a range of figures for guidance, development funds may take from 10 per cent to 50 per cent of earnings, or expressed another way, from 1 per cent to 5 per cent of gross sales, depending on the circumstances surrounding each particular enterprise.

3. What, specifically, will be obtained?

Certain answers to this question will appear in the following discussion of the program, the budget and the administration.

C. The Development Program

What, specifically, will be obtained by a certain development expenditure, depends on the care and foresight displayed in the establishment of a program, in the budgeting of it; and on the skill with which the work is administered.

The program is merely a statement of the various objectives to be reached and the avenues by which the objectives are to be approached. The objectives may originate from suggestions or demands by sales or production, both of which are in an excellent position to determine well justified projects, sales knowing intimately the consumer and competitor situation from field contacts; production, the manufacturing situation as it concerns materials, machines and methods.

The development manager or more commonly the technical director, contributes to a balanced program by a disinterested appraisal of the state of the enterprise as a whole, recommending those objectives which appear to be most needed, which may concern neither sales nor production.

The objectives of the various projects having been precisely formulated, the avenues of attack are next visualized; the more avenues, the better chance of success. The projects can advantageously be grouped as follows:

1. Protection of present business and existing capital:

Product improvement, cost improvement, and production improvement, are all normally interrelated and seldom capable of being dealt with separately.

2. Development of new business requiring new invested capital:

New products *complimenting* or *diversifying* present products,

New production methods, machines or materials *integrating* with the existing basic business enterprise, including the utilization of by-products.

The first heading falls in the category of bread and butter work, and must come first in any program. The second is fully as important to a sound well-rounded depression resisting enterprise. The word "new" under the second heading does not mean copying competition in an already overcrowded field.

Classifying the projects in this manner will prevent an unbalanced program or confirm the exigencies of the moment which may demand it.

The real test of development planning comes at this point. Usually the first list of projects contain many times the number which can be efficiently handled during a given time. The winning horses must be selected before the race begins. The points to consider are:

(a) Granted that the development work is 100 per cent successful in reaching any certain objective, will the results be put to work practically and commercially to produce profits? This calls for a positive answer from production, from sales, from the comptroller, from the Manager. This is the No. 1 consideration and if there is substantial doubt concerning reducing the work to practice and to profit, development money should not be spent to put reports in the files. What funds and energy have been wasted because this question was not asked or not courageously answered cannot even be guessed at. It is difficult enough to avoid the pitfalls when one knows of them and thoroughly bores out the answers beforehand.

(b) Will capital money be available to commercialize the results? This is a corollary of (a).

(c) What is the probable rate of amortization of the total expenditure, both expense and capital? Those projects of highest rate get the call, other factors being equal.

(d) What period of time to fruition will be involved? The longer the time the less attractive the project.

(e) What is the probability of success? This involves various elements, for example, the number of lines of attack to be employed (a single avenue of attack is always dangerous), the clarity with which the attack can be visualized (does the answer depend on inventive genius or on following well known procedures).

(f) Are special facilities or personnel required?

(g) To what extent does the project integrate with existing products, selling methods, manufacturing methods, machines and raw materials?

(h) Does the project involve diversification of the business?

(i) Does the project lend itself to a patent structure?

(j) Finally, to what extent does the project balance and diversify the program? Safety in development work follows the same old rule of diversification. With the best projects selected, successful performance is assured through adequate administration and continued concerted attack.

D. The Development Budget

With a program established, the budgeting of the work resolves itself into an estimating job involving salaries, laboratory direct expense, laboratory fixed charges, outside professional services and the expense of plant developments.

The expense of plant developments is to be estimated first. It is strictly a development expense to conduct plant trials resulting in no merchantable goods. When a product, process or machine is ready for development operation on production, then the difference between actual manufacturing costs and estimated standard costs is again a development expense. When standard cost, quality and production rates are attained over a reasonable period of time, production takes over and development expense stops. The expense of each plant development, exclusive of development salaries, is to be estimated and this total deducted from the total development appropriation as determined under B(2). The remainder is available for all other expense which may be termed for convenience "laboratory expense."

This portion is roughly allocated as follows:

Salaries	50 to 70 per cent
Direct Expense	15 to 20 per cent
Fixed Expense	5 to 10 per cent
Professional Services	30 to 0 per cent
	100 - 100 per cent

Thus the number of men to be available is ascertained and the program established accordingly. Or vice versa, the size of the company's staff is ascertained from the program as established, and the total appropriation determined.

Direct laboratory expense includes all the items necessary for operation, as supplies and experimental facilities not capitalizable, maintenance, travel, services of steam, electricity, water, etc. These vary with the size of staff. Travel, particularly, must not be underestimated.

Laboratory fixed charges need no discussion. Depreciation rate should be made ample since change and replacement of facilities may be rapid.

Outside professional services, both technical and legal, as a rule are a necessity. It is given only to the largest development organizations to carry as staff men experts in all fields encountered. It is but the part of wisdom to go to a specialist when his services are required. Particularly a competent patent attorney should be in almost constant touch with the development staff.

There is always a tendency to overstaff, to the detriment of the other budget items in which case, men are available but have insufficient tools with which to work efficiently.

The capital budget for development is quite aside from the expense budget. Capital is required for laboratory facilities and for plant developments and is estimated as any other capital job.

An erroneous conception of the purpose of the budget is sometimes prevalent. It is not so much a precise estimate of what will be spent as it is a current control to keep expenditures within an agreed-upon framework as the work progresses. It is a goal to be reached by such means as may be required. If expenditures are currently underrunning the budget, which happens in conservative administration, expense can be safely accelerated, and conversely decelerated. Development budgets as with any other type, can easily be met within 5 per cent simultaneously with realization of the broad objectives.

A budget once established is money appropriated. There is neither necessity nor utility in those practices which require reauthorization at the time specific expenditures are to be made.

Allocation or appropriation of funds against specific projects serves little utility, at least until a development reaches the plant stage.

E. Administration in Line with Budget

Administration of development is a substantial subject in itself and discussion of it outside the scope of this presentation. Suffice it to say that the program must be broken down into practical day by day work plans and reports of work done. These must be tied into accounting and statements of expense rendered promptly compared to budget. Concurrently a precise knowledge of results compared to objectives is fundamental.

In conclusion, if the objectives are to be reached and the budget met, it is important to avoid the common causes of inefficiency and even failure by the application of a few common sense rules:

The program must contain a majority of "sure fire" projects.

The program must be diversified.

The program must carry plenty of "money" justification. Intangibles are seldom profit makers.

Objectives must be very clearly defined.

Utility of the completed development in the future, assuming entire success, must be guaranteed.

Priorities once established must remain unchanged for a reasonable period of time.

Miscellaneous service requests must be kept to a minimum. Curiosity for its own sake is largely unprofitable.

Too many projects active at one time must be avoided as progress is then likely to be made on none.

Practical Notes On

Photomicrography

JOHN V. BUTTERFIELD*

▸▸▸ PHOTOMICROGRAPHY and manipulation of the microscope have been the subjects of a number of publications. It frequently happens, however, that the man in the laboratory or mill who turns to photomicrography as a means of recording his observations finds that in the literature he has available, there is a lack of information on the actual setting up and operation of apparatus for photomicrography. With this thought in mind, the writer has endeavored to include here some practical information on the setting up of the apparatus and its use, in the hope that it may be of assistance to the technologist in producing creditable photomicrographs.

Photography with the microscope, to be successful, depends upon the same three factors that determine a successful photograph of the common variety: namely, (1) adequate camera and optical equipment; (2) correctly illuminated subject; and (3) proper handling of the photographic materials. Of the factors mentioned, shortcomings in the first and second have been found by the writer to be the ones most frequently responsible for poor photomicrographs. These two, then, will be given primary consideration.

The Microscope

It should go without saying that a professional type microscope of standard, reliable make fitted with well corrected lenses, is a prime requisite for either good visual work or the production of first quality photomicrographs. The serious worker's efforts are defeated, to a great extent at least, if amateurish equipment and methods are applied. Through a knowledge of his material and the ability to see what he wants to see, he may use a microscope that is amateurish in design and poorly equipped optically, but when it comes to clear, detailed photographic records that carry an accurate story, this type of equipment will not produce the desired results.

The Camera

The photomicrographic camera in its most convenient form consists of a light-tight, flexible bellows, permitting a variation in projection distance from the microscope eyepiece to the film, thus affording adjustment in magnification over that provided by the microscope optics directly. The camera must be supported rigidly and preferably on a common base with the microscope and illuminator, to prevent the camera and microscope from vibrating separately.

In photomicrography, the microscope becomes the lens of the camera. Any arrangement using a conventional camera with its normal photographic lens in place is only an invitation to trouble. Reflections from the lens surfaces, causing flare spots in the final picture; disturbance of the normal magnification of the microscope optics; and, more than likely, the addition of certain distortions or other aberrations to the image are some of the troubles encountered with such a setup. Regardless of how finely corrected the camera lens may be, it will add nothing to the image formed by the optics of the microscope. Since the better camera lenses contain a number of lens elements, the opportunity for flares or ghosts due to reflection is only amplified.

Due to its convenience where a large number of routine photographs are to be made, especially when the preparations are fresh and in fluid mounts, the vertical type of photomicrographic camera shown in Figure 1 is most generally used. It is to this type of setup that the present remarks will be confined.

The Illuminator

For general, visual, microscopic observations, a simple form of lamp consisting of a common inside frosted incandescent bulb alone, or combined in a suitable housing with a diffusing glass, is commonly quite satisfactory. Such an illuminator, however, falls short of fulfilling the requirements for critical work, either visual or photographic. For critical work the specimen should be illuminated by a cone of convergent light originating from a homogenous source, and brought to a focus on the specimen by a suitable lens or system of lenses. The most practical source of illumination at least

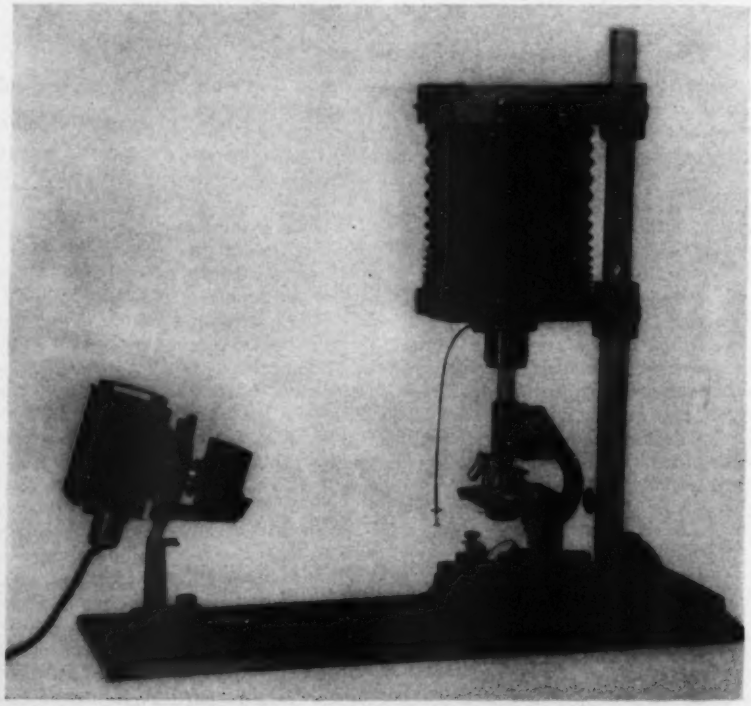

Fig. 1—Typical vertical photomicrographic camera with laboratory microscope and illuminator mounted on a common base.

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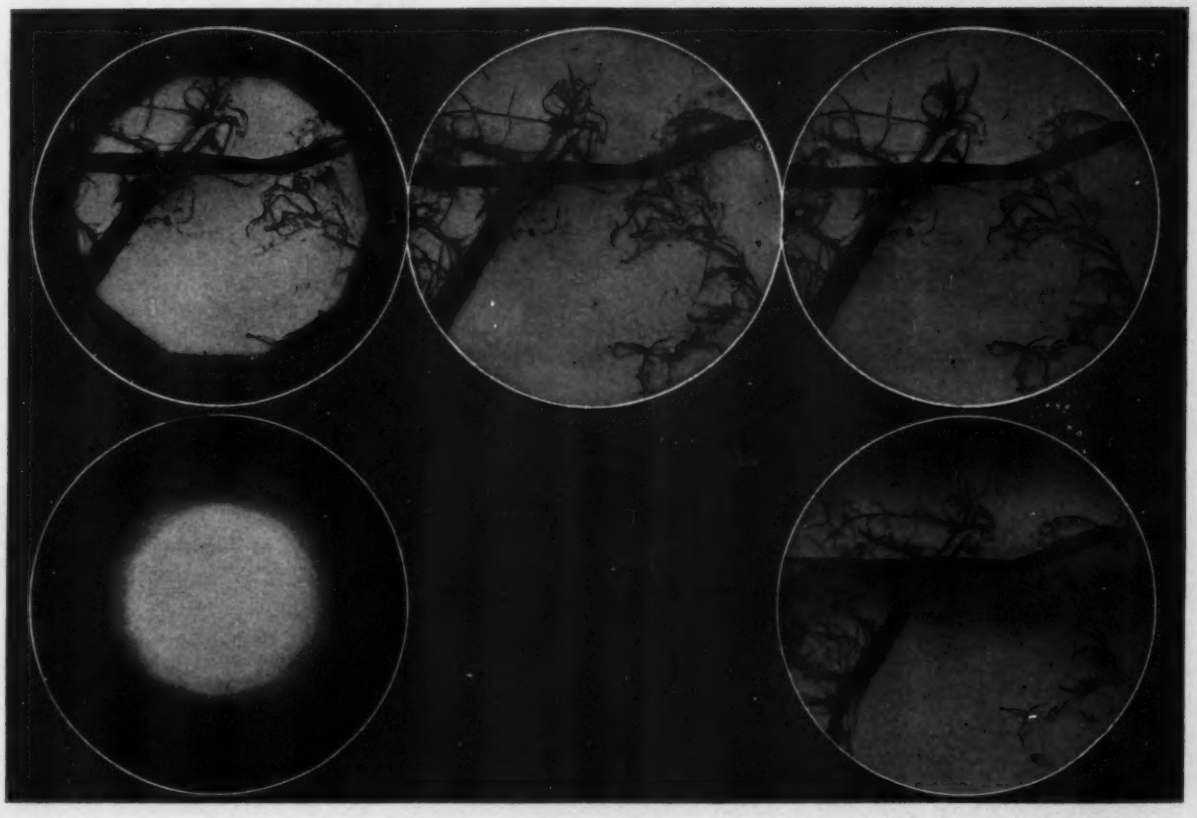

Fig. 2—Showing field seen through the microscope eyepiece with the substage condenser correctly focused to image the lamp diaphragm in the specimen plane. Normally, the diaphragm is opened to clear the entire field. . . . Fig. 3—Showing the effect of using the microscope objective at too low an aperture. Magnification and specimen same as for Fig. 4. . . . Fig. 4—Showing correct appearance of the specimen when the apparatus is correctly aligned and the objective is used at a normal aperture. Fibers from 100 per cent rag content paper. Herzberg stain. (Fibers red.) 16 mm. 0.30 N.A. Objective. Effective N.A. about 0.25. Transmitted light; ribbon filament lamp; Wratten B. Filter; compensating eyepiece; magnification 100X; Commercial Ortho film; developed in D-61A. Exposure 1 second. . . . Fig. 5—Back lens of the objective is shown by the larger light area. Central bright spot shows amount of aperture illuminated by the substage condenser. The outline of the substage diaphragm may be seen readily. The outer margin of the lens is illuminated by light diffused by the specimen. . . . Fig. 6—To illustrate a common fault due to improper adjustment of illumination or poor alignment of the microscope optics. Specimen and magnification same as for Figures 5 and 4.

for the greater portion of photomicrographic work is the incandescent tungsten filament. One of the best forms of this source of light is the 6-volt, 108-watt ribbon filament bulb. The tungsten arc is also an excellent source of somewhat higher intensity. A suitable housing to enclose the bulb with a condenser lens of large aperture and convenient focal length are required.

Alignment of the Apparatus

It is of the utmost importance in the production of a good photomicrograph that the illuminator, microscope and camera are aligned to a common axis. With the vertical camera it is convenient to bring the microscope and camera into alignment first and to adjust the illuminator last. If the microscope is not equipped with centerable substage condenser and objectives, the optics will have been centered by the manufacturer. If the substage condenser alone is centerable, the condenser first must be centered with the objective and eye piece.

If the objectives are on centering nosepiece adapters, it is necessary that they are all accurately centered to the body tube and the substage. These centering procedures may be found described in books covering the use and care of the microscope.

The camera, of course, should be supported with its axis as nearly perpendicular as possible to the baseboard. The front board of the camera should be provided with a shutter and some means for making a light-tight coupling with the eyepiece of the microscope. Set the microscope directly under the camera and lower the front board bringing the light-tight coupling device together. Using an objective of about 16 mm. focal length and, say, a 10X eyepiece, focus on some specimen slide.

Most any source of light such as a 50-watt, frosted bulb in a desk lamp may be used for making the present adjustments. Focus the microscope to project the field onto the ground glass of the camera. Note the detail imaged at the center of the ground glass focusing screen. The focusing screen should be provided with cross lines at its center. Adjust the bellows from its shortest to its longest length and note whether the field remains centered on the ground glass. If the detail imaged on the cross lines moves away from the center as this adjustment is made, the microscope and camera are not lined up on a common axis. Tilt the microscope and move it sidewise as needed, keeping the eyepiece concentric with the opening in the front of the camera, until, as the camera back is moved from the shortest to the extreme extensions, the edges of the projected field come tangent to opposite sides of the focusing screen simultaneously, and detail at the center of the field of view stays at the intersection of the cross lines of the focusing screen. During these adjustments the pre-centered substage condenser and objectives must not be disturbed.

The next step is the alignment of

the illuminator. First see that the light source is accurately centered to the lamp condenser. Turn the light source on and tilt the lamp and adjust it for height to direct the beam of light onto the plane side of the microscope mirror. Focus the lamp condenser and tilt the mirror until the light source is imaged directly in the opening of the substage condenser. Adjust the distance from lamp to mirror until the narrowest dimension of the light source image is sufficient to completely fill the maximum opening of the condenser or its iris diaphragm. Now looking into the microscope eyepiece, with the microscope still in focus on the specimen, rack the substage condenser up or down until the surface of the lamp condenser is imaged at the specimen plane. It probably will be necessary to introduce neutral density filters or dense color filters to reduce the illumination to a comfortable level. Do not use diffusing glass for this and do not close down the substage condenser diaphragm. To locate the image of the lamp condenser a small strip of paper may be cut and set up against the lens so that its end is at the center of the lens surface. An iris diaphragm directly in front of the lamp condenser is a convenience and is frequently provided on lamps used for photomicrographic work. If a diaphragm is provided, reduce it to a small opening. Focus the substage condenser and tilt the microscope mirror until the image of the paper strip or the lamp iris is centered in the field of view, as shown in Figure 2. Now remove the eyepiece and look down at the rear lens of the microscope objective. An image of the light source should be seen there more or less complete. This is best observed by looking through a pin hole cap substituted for the eyepiece. (A piece of tinfoil may be pressed over the end of the eyepiece tube of the microscope and pierced at the center of the tube opening with a pin to provide this item if such a cap is not supplied with the microscope.) If the image of the light source is seen to illuminate the objective lens completely, (the lens will present a full, round disc of light if a ribbon filament, tungsten arc or similar source is being used), well and good, the adjustments are complete. Most likely, however, it will be found that the image is not centered in the objective. In this case the lamp must be adjusted for height and tilt and the mirror tilted again until the back lens of the objective is evenly illuminated at the same time the object at the lamp condenser is centered in the field of view. During these adjustments keep the substage diaphragm wide open.

The time spent in carefully aligning the apparatus is amply repaid, for the full capabilities of our microscope optics can be realized only when these conditions are met.

Careful Adjustment of Illumination a Necessity

A microscope is used for examining an object in order to reveal fine detail in the object that is not readily visible to the unaided eye. Both magnification of the detail and resolution are required. Too frequently the factor of resolution is lost sight of in practice and in examining or photographing a specimen the magnification alone is the chief point of consideration. Without resolution, however, magnification is useless. Due to limited space, it is impossible to go into a discussion of the theory of resolution. A full treatment of the subject is found in any of the standard books on the microscope. For present purposes it is sufficient to say that in order for the objective to show the fine detail present in the specimen, the light reaching the specimen must be brought to a focus by the substage condenser at an angle at least equal to the maximum angle accepted by the objective. The size of half this angle is a value referred to as the numerical aperture (N.A.) of an objective of the "dry" type, and is a measure of its ability to reproduce under magnification the fine structure within the specimen. When the full N.A. of the objective is illuminated, the full resolving power of that particular lens is realized. The substage condenser of most microscopes is made in divisible form. In the more common Abbe type two elements are provided. In the aplanatic and achromatic forms the condenser can usually be separated into three elements. For objectives having an N.A. of about 0.20 to 0.40 the bottom element is generally used alone. In the case of three-element condensers, the second element is added to work with objectives having an N.A. from 0.40 up to about 0.65. The third element is added for the "high dry" and oil immersion objectives. In each case the condenser is focused as previously described. Although the condenser in its complete form would usually supply a cone of light with an N.A. of 1.0 without oil immersion, which would be more than enough to fill the aperture of a low or medium power objective, this combination is not satisfactory due to the short focal length of the condenser. The result is an image of the lamp condenser too small to fill the field seen in the eyepiece.

At the same time that the N.A. of an objective affects its resolving power, it also affects the depth of focus. As the N.A. increases, depth of focus decreases, so that generally it is necessary to provide a means of adjusting the aperture, the same as in an ordinary camera lens, so that some value of N.A. may be chosen which will show good detail and at the same time give a sufficient depth of focus. The iris diaphragm attached to the substage condenser of the microscope is provided for this purpose, but care must be exercised in its use. Too many times this device is used as a means of reducing illumination with the result that good definition is lost.

The substage diaphragm is placed at the back focal plane of the substage condenser and consequently is imaged in the back focal plane of the microscope objective. It follows then that as the diaphragm opening is reduced the N.A. of the condenser is diminished, causing a reduction in the effective N.A. of the objective. Now the image of a point as formed by a lens cannot, for physical reasons, be another point, but rather it becomes a small disc of light, the size of which is dependent upon the lens aperture. This relation is such that the disc of light becomes greater as aperture is decreased. A considerable reduction in aperture then causes an overlapping of these light discs over the entire specimen image so that a general broadening of the fine lines and obliteration of fine granules, etc., results. The effect of too great a reduction in aperture is illustrated in Figure 3. The thickening of the fine fibers is apparent as well as diffraction bands throughout the coarser fibers and in other parts of the field. Note the diffraction patterns and general appearance of the particle of material caught on the broad fiber in the upper part of the field, also the appearance of dark spots in the field due to dust particles on the surfaces of the eyepieces. Compare this figure with Figure 4.

The extent to which the aperture of an objective may be reduced is best determined by careful visual observation. With highly transparent specimens such as unstained paper fibers mounted in water, balsam or other media whose refractive index is near that of the fibers, little detail can be seen with the objective working at full aperture and it is usually necessary to close the substage diaphragm somewhat in order to introduce contrast. The best guide is to observe when the first sign of defraction or doubling appears about the outlines of the specimen. The diaphragm should then be opened as far as permissible beyond where this phenomenon appears. The amount of aperture in use should be

(*Concluded on page* 1263.)

Opaque Papers*

WILLIAM R. WILLETS
Titanium Pigment Corporation

▸▸▸ IT IS GENERALLY ADMITTED THAT titanium pigments offer the best means of opacifying and brightening paper, and the increase in their use confirms this statement. The consumption of titanium pigments in papermaking in the past few years has increased many fold, and this shows not only a growing consumer demand but also the willingness of the paper manufacturer to meet the situation.

The unique properties of the pigments, together with their application to papermaking, have been so widely discussed in the past that there seems no particular reason at this time to discuss these phases beyond stating that titanium dioxide is the most effective opacifying and brightening agent known. However, there are still certain questions which occur again and again, and so an attempt will be made herein to answer a few which are frequently asked.

Opacity Versus Pigment Content

One of the most frequent questions is "How much titanium shall be used?" It is impossible to answer this question definitely without knowing certain facts. The first of these is the opacity of the unpigmented paper to be treated, and the second is the final opacity desired. Naturally the more pigment added, the greater the opacity produced.

In general, there are certain economic considerations which indicate practical limits for pigment addition beyond which further addition is uneconomical, as judged by the improvements produced. It is well known that if a curve for opacity is plotted versus pigment content, there will tend to be a flattening out of the curve at the higher ranges, and above this point the further addition of pigment produces less benefit than the first increments.

In this connection, the examples in the accompanying tabulation may be of interest. They also serve to illustrate the relative opacifying effects of various amounts of titanium dioxide at different opacity levels, as well as variations in papers from different mills.

The flattening of the curve as the pigment content increases is best illustrated by the glassine examples in which 0.5 per cent pigment increased the opacity 11 per cent (or 22 points for each one per cent pigment content), 2.2 per cent increased the opacity 31.6 per cent (or slightly over 14 points for each per cent pigment content), while 4.5 per cent increased the opacity 42 per cent (or about 9.3 points for each per cent pigment content). The situation with the waxed paper samples is slightly different because of the presence of the wax, but even here the trend is evident.

The effect of pigmentation at different opacity levels is also illustrated. A titanium dioxide content of 1.2 per cent raised the opacity of a 10 pound tissue almost 14 points (or 11.5 points for each per cent pigment content), while a similar amount only raised the opacity of a 50-pound book 4 per cent (or about 3-1/3 points for each per cent pigment content), because the opacity of the book paper was in a much higher range than that of the tissue. (Experimental curves and data giving the effect of different degrees of pigmentation on opacity have been published in several articles over the past few years, and these serve to bear out the conclusions given above.)

The importance of knowing the opacity of the unpigmented paper, and the ultimate opacity desired, is thus demonstrated. With these points in mind, the requisite pigment content to produce the desired opacity can be estimated. The amount of pigment to be added to the beater to produce a definite content in the sheet will, naturally, be dependent on the retention obtainable under a given set of conditions.

The quantity to be used, therefore, varies very widely. In cases where only a slight improvement of opacity and brightness is desired, it is frequently the custom to have a titanium dioxide content of 1 per cent or even less. For papers that may be classified as really "opaque," the titanium dioxide content will usually be 4 per cent or more.

AUTHOR'S NOTE: A recent article (in which neither the author nor his associates had any part) makes some observations which should be of interest to every paper manufacturer, salesman and consumer. While the article devotes itself generally to the advancements made in colored and opaque papers, two brief quotations appear particularly pertinent to the subject at hand: "... since the introduction of titanium dioxide, the trend is moving rapidly toward opaque perfection and improved brightness ..." and "... the introduction of titanium dioxide to the paper industry at a relatively low price has revolutionized the opacifying of all grades of paper ..." (1).

Kind of Paper	UNPIGMENTED	PIGMENTED	
	Per cent Opacity	Per cent Titanium Dioxide Content	Per cent Opacity
9 lb. Rag Content Bond	58.0	7.1	79.8
13 lb. Rag Content Bond			
Mill 1	62.3	1.3	71.2
Mill 2	71.5	6.3	83.9
16 lb. Rag Content Bond	74.1	4.0	86.4
20 lb. Rag Content Bond			
Mill A	78.7	1.3	82.4
Mill B	81.8	2.4	88.5
Mill C	77.5	3.0	86.9
Mill D	81.6	4.0	92.6
20 lb. Sulphite Bond	85.0	2.7	93.0
16 lb. Sulphite Bond	73.5	4.0	88.1
50 lb. Book S.&S.C.	86.0	1.2	90.0
43 lb. Book E.F.	86.0	1.0	88.0
25 lb. Glassine	18.0	0.5	29.0
25 lb. Glassine	18.0	2.2	49.6
25 lb. Glassine	19.0	4.5	61.0
Waxed	22.9	2.2	47.0
Waxed	23.0	4.0	62.0
10 lb. Tissue	31.3	1.2	45.1

*Presented at a meeting of the Salesmen's Association of the Paper Industry, Hotel Lexington, New York City, January 22, 1940.

Effect of Pigment on Strength

Another question commonly asked is "How does pigment affect strength?" Here again the filler content is a prime consideration.

It may reasonably be assumed that the presence of large amounts of filler will affect the strength of a sheet of paper adversely. If fibrous material having a definite fiber strength is replaced by an equal amount of mineral matter, the strength of the filled paper will be less. This loss in strength theoretically should be proportional to the amount of filler present. Therefore, a sheet made opaque by using a large amount of a low refractive index filler (such as clay) will be much weaker than a sheet pigmented with a small amount of highly opaque titanium dioxide.

L. S. Reid, of the Metropolitan Life Insurance Company, in his discussion of an article on the properties of pigmented bond papers *(2)* reported that the average strength of eleven shipments of a 16-pound opacified sulphite bond containing about 6 per cent ash and having an opacity of 88 per cent was equal to that of sixty shipments of unopacified sulphite bond containing slightly over 1 per cent ash and having an opacity of only 73.5 per cent.

From the data available, it appears that the use of the usual amounts of titanium dioxide will have very little effect on strength. Variations induced by pigmentation will probably not be any greater than the usual variations to be expected from two runs of paper.

Pigment and Paper Permanence

Occasionally some one asks the question: "What effect does titanium dioxide have on paper permanence?" It might naturally be assumed that because titanium dioxide is absolutely inert chemically it will have no effect on the permanence of the paper, and this assumption is confirmed by work performed by the National Bureau of Standards *(3)*.

While titanium dioxide has no effect on the deterioration of paper when considered from a physical viewpoint, it has a decidedly beneficial effect on the fading of paper. The other constituents of paper such as fiber, sizing, etc., all tend to change color upon aging while titanium dioxide retains its whiteness and brightness and therefore masks the discoloration of the other constituents. Consequently paper made using titanium dioxide is more permanently white and bright than unpigmented paper.

Pigment and Printing Properties

In answer to the question: "How does pigmentation affect printing?" it can be said that titanium dioxide will improve the printing charactertistics of paper. In the first place, pigmentation makes paper more opaque and bright, which results in better contrast between the printing and its background. Second, show-through is minimized, which also enhances printing. Third, it should be pointed out that when paper is printed, there may be a certain diffuse lateral penetration of the printing ink vehicle, in addition to the actual penetration through the sheet (which produces show-through). In penetrating laterally the vehicle follows the pores of the sheet, causing minute irregular translucent areas adjacent to the printed character, making it appear fuzzy at the edges. However, titanium dioxide still retains its opacity in contact with the vehicle; therefore, when it is present in the sheet, translucent areas adjacent to the printed character do not occur. Consequently, the edges of the printed character are well defined, and fuzziness is reduced. Naturally, this is a general statement and the old rule of "adapting the ink to the paper" still holds true.

Pigment and Surface

The question: "What effect does titanium dioxide have on surface?" can be answered by stating that the surface is improved. This is a result of the fineness and uniformity of titanium dioxide, which will average under 0.5 microns (0.00002 inches) in particle size. All types of finish can be produced when pigment is used. For example, in coated papers pigments are used for mat finishes as well as for high gloss enamel finishes; in book papers pigments are used in sheets finished to give anything from a supercalendered surface down to an antique finish; while in bond and ledger papers they are successfully used in cockle, ripple, plated, parchment, etc., finishes.

Cost of Pigmented Papers

One of the most frequent questions raised is: "How much does opaque paper cost?" One thing is certain; it costs less to produce an opaque paper today than it did a few years ago because the present price of pigments is so very much lower.

It may be well to give a concrete example of the cost of opacifying a typical sheet. If the opacity of the sheet of paper is to be raised from 82 per cent to 93 per cent, it can be determined from available data that it will require about 4 per cent titanium dioxide content to produce this increase. Assuming a retention of about two-thirds of the pigment added, which is not unduly high for most mills, it will be necessary to add about 6 per cent of titanium dioxide to the beater to produce the desired content. The pigment addition, therefore will be approximately 120 pounds per ton, which at a cost of 13c a pound for titanium dioxide, would mean a pigment cost of $15.60 per ton of paper. This does not present a complete picture, however, because in the case of high-grade papers, the price per pound of the paper will be higher than the cost per pound of the pigment. At any rate, the pigment is sold as paper, so its cost is not strictly entirely additive.

Naturally, the consumer is most interested in the price of the paper he buys. While it is true that pigmented papers usually cost more per pound the results produced by pigmentation are so beneficial that the paper is actually worth more than the slight additional charge. In addition, it can be shown that the actual cost of paper for any job is a comparatively small proportion of the total cost of producing that job. In the production of an average trade book, the actual cost of the paper is only in the neighborhood of 20 per cent. However, the proportional paper cost varies so widely with the type and size of the job that it is manifestly impossible to give any "average" figure.

It may be well to discuss this point more specifically on the basis of recent information on the cost of offset printing produced over a six months' period involving the production of some 1,300 jobs and the use of about 30 tons of paper.

In this work, 20-pound (17x22-500) opaque offset paper was used at a cost of around 8 to 8½ cents a pound, or a total of $4,800 to $5,100. Had the paper not been pigmented, it would have been necessary to specify a 28-pound paper to secure the requisite opacity. This would have meant using 84,000 pounds of paper at a cost of 7 to 7½ cents a pound, or a total of $5,880 to $6,300. The actual increase in cost for the heavier unpigmented paper would have averaged well over $1,000.

However, this is not the whole story. Assuming an average mailing cost of 11 cents a pound, the expense of mailing the opaque paper job would be in the neighborhood of $6,600 in contrast to the mailing cost for the unpigmented paper job of around $9,240. Therefore, a further savings

of $2,640 for the pigmented paper is now indicated, raising the total savings effected to over $3,500.

Naturally the question arises as to whether or not the printer could have "gotten by" using a 24-pound unpigmented sheet. Although the individual who supplied the information given above stated that this was not the case, it may be well to note such an example. The use of 24-pound paper would have required 72,000 pounds at a cost of $5,040 to $5,400, averaging somewhat more than the cost of 20-pound pigment paper. But the mailing costs for the unpigmented 24-pound paper would be $7,920, or about $1,300 more than for the pigmented 20-pound paper. So even if a 24-pound unpigmented paper could have been used, the economics involved still strongly favored the use of 20-pound pigmented paper.

The above examples suffice to show that the use of opaque papers may frequently result in lower ultimate costs to the consumer because of the savings involved in using less tonnage of the opacified lighter weights, and in mailing costs. These savings more than offset the added cost per pound of the pigmented paper.

Application of Pigment

The above represents an attempt to answer some of the questions which are generally asked. Specific questions which are asked in reference to a particular problem can only be answered by a study of that problem.

But there is one more general question which arises and that is: "To what grades of paper are titanium pigments well adapted?" This can be broadly answered by stating that pigmentation is an advantage wherever opacity, brightness, color, printing qualities, weight and strength are factors.

Again, to be more specific, it might be well to note that pigmentation is now an established practice for all types of printing papers, including book, Bible, magazine, catalogue (both chemical pulp and groundwood sheets), coated and offset; envelope; bonds and ledgers; manifold and air mail; wrapping tissues and the like; waxed papers; paper boards, both lined and coated, waxed and unwaxed, etc. Because titanium pigments are so well adapted to the foregoing grades, they are being used in them in ever-increasing amounts.

BIBLIOGRAPHY

1) "America Takes the Lead in the Chemistry of Colored Papers," *Paper Progress*, October 1939:17, 18.

2) Willets, W. R. and Bingham, R. T., "Properties of Pigmented Bond Papers," *Tech. Assoc. Papers, 21*, 164-6 (1939). Discussion by L. S. Reid, *Ibid* 79-80.

3) Shaw, M. B. and O'Leary, M. J. "Effect of Filling and Sizing Materials on Stability of Book Papers." *Journal of Research, 21:* 671-695 (November, 1938.) Bureau of Standards R.P., 1149.

Practical Notes on Photomicrography

(*Continued from page* 1260.)

observed by removing the microscope eyepiece and looking down through the body tube at the rear lens of the objective. An image of the substage iris should be seen. Figure 5 is a photograph of the rear lens of the 16 mm. 0.30 N.A. objective used in making the accompanying photomicrographs, with the substage diaphragm adjusted to give an effective N.A. of about 0.20. A reduction of 1/3 the N.A. is usually about all that can be made without introducing the undesirable effects mentioned. At the time Figure 4 was made the objective was used at about ¾ its full aperture.

Figure 6 illustrates the results of improper alignment of the illuminator and microscope. The photograph reveals what the eye did not appreciate. The fact that the field of view may appear evenly illuminated to the eye does not mean that the illumination is in correct adjustment.

Photographic Technique

Processing of the photographic negative has not been discussed here since it is felt that this is sufficiently covered in the literature supplied by the manufacturers of such materials. Suffice it to say that much time and material may be wasted "chasing butterflies," and that it is better to follow closely the processing technique recommended for a certain negative material than to try first one, then another, without determining the full possibilities of either.

Specimen Preparation

Another factor contributing to successful photomicrographs is a well prepared specimen. Even though the equipment may be the best, and all other factors favorable, a sloppily prepared specimen cannot be expected to appear in the finished print as anything but what it actually is; namely, something that could have been done better. A good field can be presented with a wealth of detail shown, but particles of dirt, air bubbles, and other material traceable to poor microtechnique will detract from an otherwise good picture. Wherever possible the staining process should be carefully controlled to produce the right degree of contrast yet leaving the specimen sufficiently transparent to reveal the finest structure within it.

The specimen should be covered with a conventional cover glass for the best results in both visual and photomicrographic work. This applies especially when objectives of 16 mm. and shorter focal lengths are employed. In the design of the objectives the cover glass is taken into consideration and in use, the elimination of the cover glass on the introduction of covers appreciably greater or less than the normal 0.18 mm. cover thickness is sufficient to upset the correction of the higher power objectives.

The subject shown in the accompanying photomicrographs was prepared in the standard manner prescribed for fiber analysis from a sample of 100 per cent rag content paper. The fibers were treated with Herzberg stain and a cover glass placed over them. A ring of paraffin was run around the edge of the cover glass with a hot wire to prevent evaporation. The field shown is presented not so much as an example of representative fibers (the author claims no knowledge of paper technology), but chiefly to show with a subject familiar to the reader, how important it is to give careful consideration to the treatment of the optical system of the photomicrographic setup. It is hoped that these illustrations and the preceding remarks may be of assistance in locating the source of, and remedying some of the difficulties encountered by the technologist.

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▶▶▶ THE NEW YORK STATE COLLEGE OF FORESTRY, Syracuse, New York, has just made the first newsprint from red pine. Prof. Hisey, of the Pulp and Paper Department, states this is the first time that the entire process of papermaking from seedling trees to the finished product has been carried on by an educational institution. A further interesting fact is that the red pine wood used came from trees which were planted in 1915 on land of the New York State Ranger School, a branch of the College at Wanakena, New York. The site of this planting previously had been commercially logged and had the misfortune to have been burned over in a subsequent forest fire. Yet in 23 years the newly planted trees grew to a height of 35-40 ft., and 6-10 in. in diameter.

A New Theory of Chipper Design

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▸▸▸ A CHIPPER WITH ENOUGH KNIVES to put two cuts in a stick at one time has changed several ideas about chipping that have been quite generally accepted for many years.

It has been thought that only one knife could pass the spout opening at a time because the first knife had to clear the stick before the second could engage it. The sketch shows why this thought is wrong.

Each knife cuts into the stick at an angle and not in a vertical plane. Since the path of the cutting edge is in a vertical plane, the log must move in as the knife descends. There is nothing to stop this inward movement, because the only places the stick touches the disc are the corners of the chip opening edges. Below these lines the stick tapers away with the angle at which it was cut by the previous knife. At these lines of contact the chips are actually peeling off and going through the disc, thus allowing the stick to move on in continuously.

It also has been thought that the number of cuts per minute was limited by the time it took a stick to drop after a cut had been completed. Discs were made with two or three knives just to give the log more time to get down to the disc before the next cut started.

If 19 per cent is taken as the coefficient of friction between slightly lubricated hardwood and cast iron surfaces, it is easy to figure the time it would take a log to slide down a 45 deg. spout ⅜ of an inch for a chip of that length. The calculation is made as follows:

$$T = \sqrt{\frac{2 \times \frac{3}{8}}{32.16 \times 81\% \times \sin 45^\circ \times 12}} = 1/13 \text{ second}$$

T = Time in seconds
32.16 = Acceleration due to gravity
12 = Inches per foot

A four-knife chipper running 200 r.p.m., which is about as slowly as one ever operates, would require just about that much time between cuts for a stick to travel ⅜ of an inch. If from this time is deducted the time required for the knife to go through the stick (for an 18-in. stick, about half the time available) it is seen that the force of gravity alone cannot be depended upon to get the log down to the disc in time for the next cut.

Since it is not the force of gravity that is to be depended on to get the log down for the next cut, it must be the pulling action of the knives as they dig into the stick. The double-cut idea came from observation that most of the wear on a disc is directly back of each knife. This wear proves that logs rub on the disc immediately after each cut.

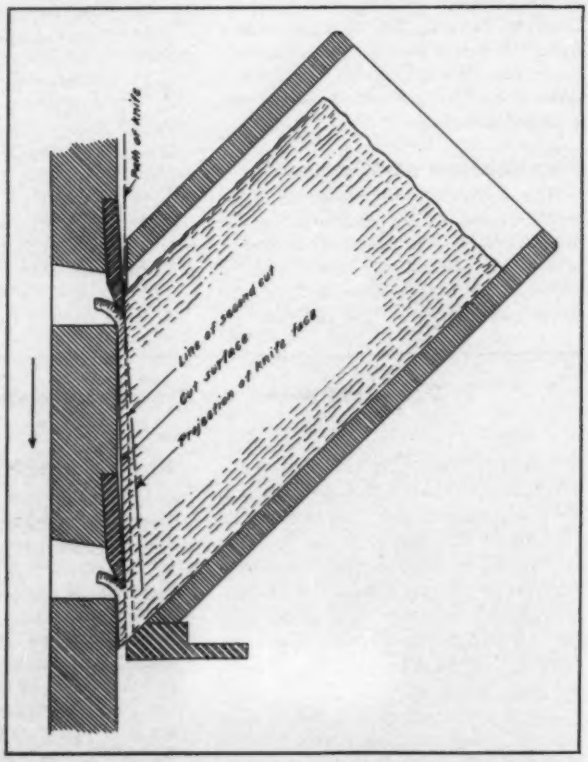
The third concept to be changed is a direct result of the second, viz., that high speeds in r.p.m. result in uneven length chips, slivers and sawdust.

In a disc with four knives or less, this concept is correct except for little chippers which run so fast that inertia holds the sticks from bouncing. A log gets down to the disc immediately after a cut and then has to wait for the next knife. This condition allows the log to bounce back or roll so that the next knife does not hit it squarely. High speed accentuates the bounce. Sometimes the next knife grazes the end of the log, thus making sawdust; or it may tip up or move sideways and sliver as a result of this bouncing.

However, with two cuts in a stick, there is no waiting for the next knife. Logs move continuously inward. There is no bouncing. Speed in r.p.m. or cuts per minute makes no difference as to the quality. Chip analyses show that amount of sawdust and slivers is reduced greatly and uniformity increased very materially.

It was thought that peak power loads for such a chipper would be tremendously high. Many chippers are being run with two or three knives just to allow the flywheel of the disc more chance to even out the peaks. With proper design, however, this phase of operation need not worry the user.

Enough power is recommended to allow the chipper to cut the desired capacity on the same basis as for the old four-knife chipper, viz., about 5 hp. hours per cord for softwood and about double that for hardwood. Then, enough flywheel is figured into the disc or pulley to carry the disc through the largest stick at the number of cuts per minute to be used without slowing down the motor harmfully. High speed helps the flywheel more than it raises the power requirements. So the highest possible safe speed is recommended.



This practice means that logs are cut up faster than the desired capacity requires, so the flywheel has time to build up again between sticks, especially between big ones.

With two cuts in a stick, the power is more even anyway. Either one knife is in the widest part of the stick, or two knives are in the narrower parts. The two conditions equalize each other.

Power used to be wasted in batting logs up the spout and

in overcoming friction and windage without chipping when logs bounced. This power is saved in the new design because there is no idle time and no bouncing.

Capacity for the chipper also can be figured quite accurately on the theoretical basis of cuts per minute, length of chip, and number of sticks per cord. It is not necessary to keep the spout full; nor is it necessary to have a long column of wood above the spout. Sticks automatically seek the inside corner of the spout where they are guided and where the knives are closer together. Each log feeds itself. With 400 r.p.m. and 100 sticks to the cord, ½ in. chips can be cut at the rate of 30 cords per hour. Under these same conditions, a 100 hp. motor should cut 20 cords per hour, although a little larger motor should be used for safety. The first 12-knife disc that was put on an old 84-in. chipper did just that in capacity with a 100-hp. motor although the speed of the chipper was lower and the flywheel consequently less.

This new theory of chipper design, based on experience in mills, allows for the production of a better quality of chips with less maintenance expense.

Cellulose Research at the Boyce Thompson Institute

As told to a staff member by DR. WANDA K. FARR, Director Cellulose Department of The Chemical Foundation, Boyce Thompson Institute

▸▸▸ RESEARCH NOW IN PROGRESS upon the microscopic, X-ray diffraction and chemical analyses of cellulosic materials began eleven years ago under the auspices of the U. S. Department of Agriculture.

Late in 1930 the laboratory was transferred from Washington, D. C., to the Boyce Thompson Institute for Plant Research, Inc., where for the next six years the microscopic and chemical work was carried on, with the help of one assistant, in a laboratory provided by the Institute and with funds for salaries and equipment furnished by the Government. The X-ray diffraction work was done in the Department of Chemistry at the University of Illinois.

Between 1929 and 1933 four studies dealing with the origin of cotton fibers, structural features of the wall suggested by microscopic and X-ray diffraction analyses, fiber abnormalities, and cell-divisions of fiber mother-cells were completed and published.

The first important results were obtained, however, in 1933 when the unit cellulose crystallite or *cellulose particle* was identified microscopically in the living cytoplasm of many types of plant cells and in various states of orientation in their cell membrane. These observations included many types of both lignified and unlignified cell membranes, and in every case observed the crystalline cellulose particles were remarkably uniform in size and represented the discontinuous phase of the membrane. The continuous phase of the membrane which surrounds the particles is non-crystalline, non-cellulosic, and, in most instances, a composite of many different colloidal substances existing in the basic protoplasm of the living cell. In the average cotton fiber this *cementing material* represents no more than five per cent of the cell membrane; in a wood fiber often as much as twenty per cent. In both cotton and wood fibers, however, the physical and chemical behavior are often expressions of the non-cellulosic and not the cellulosic membrane constituent.

Before the close of 1934 these microscopic observations had been carefully checked with X-ray diffraction analyses and *this new conception of the structure of cellulose membranes involving crystalline cellulose particles held together with colloidal cementing material was more fully described in a series of four papers.*

A summary of these data presented in April, 1935, at the Symposium of the Cellulose Division of the American Chemical Society in New York aroused the interest of the late Doctor Charles H. Herty to the extent that he brought the work to the attention of the late Francis P. Garvan, president of The Chemical Foundation, Inc. The importance of centralizing the work then being carried on with the necessary traveling from the Boyce Thompson Institute to the University of Illinois and Washington, D. C., was given careful consideration. In February, 1936, the Cellulose Department of The Chemical Foundation was established with a staff of fifteen, including laboratory assistants and a secretary. Space was furnished in a vacant floor of one wing of the Boyce Thompson Institute for Plant Research; all laboratory furnishings, scientific equipment, salaries, and operating expenses financed by the Chemical Foundation.

This recognition by the Chemical Foundation was most fortunate. The policy of the Foundation to furnish financial assistance to research in many fields, and at the same time to sponsor a spirit of complete freedom in the laboratory with respect to the course of the research is well known. Mr. Garvan's influence, as it is reflected in the Cellulose Department of the Foundation, was recently described by Dr. Farr as follows: "The research workers who enjoyed the benefits of his financial assistance and encouragement are to be found in academic and industrial institutions in all parts of the country. To those of us who were fortunate enough to meet him personally, from time to time, he never failed to bring renewed faith in the importance and dignity of the arduous tasks in which we were engaged. In all of our efforts we can hope for no greater achievement than that of fulfilling the confidence which he had in our ability, as individuals and as Americans, to assist in extending the frontiers of human knowledge" (*America First*, Vol. 3, No. 5, p. 9, Nov., 1939).

The separate phases of research now being brought to bear in this one department upon the analysis of cellulosic materials are microscopy, X-ray chemistry, organic chemistry, microanalysis, and photography. From extensive use in record making, the latter has been elevated to the position of a real technique.

The results obtained are fast spreading through published papers and lectures to both academic and industrial institutions. One of the most recent achievements of widespread interest has been the discovery of the cellulose-forming plastids in living cells. This is one of nature's most important chemical syntheses and takes place only in living cells. Before the completion of this work, the physical mechanism by which nature brings about cellulose formation was purely a matter of conjecture.

The usefulness of these findings to the paper industry is now beginning to be realized. Their first application to the interpretation of the reactions of the fibrous material during the beating process is shown in a recent paper by A. J. Bailey and R. M. Brown.[1]

(1) "Diameter Variation in Cellulose Fibrils," *Industrial and Engineering Chemistry*, Vol. 32, 57-63 (Jan. 1940).

Testing Sulphite Acid for Combined

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▶▶▶ PULP YIELDS FOR SCREENED STOCK, according to Hägglund *(1)*, increase at least by 0.2 per cent of the weight of the wood for each 0.1 per cent rise in combined acid. Pulps obtained with the higher combined also show an increase in all strength factors and in whiteness.

If such results are obtained with cooking acids with a sufficiency of combined for safe cooking, consider the effect of an insufficiency of lime at the end of a cook or the other extreme of too much lime in the acid, conditions perhaps brought about by an error in the testing of fresh acid.

The latter situation is all too familiar to every sulphite superintendent, chemist, and cook. It is not even necessary to elaborate upon the effect of such a condition on heaters, strainers, pipe lines, or blowpits or upon delays and irregularities in cooking that are brought about as a result of it.

Lime troubles may develop without an excess of combined in the acid, but it is well to bear in mind that uniform acid, even cooking and desired pulp quality cannot be had without a dependable method for testing the acid.

Typical results of acid tests made by two different methods, Winkler's and Sanders' *(2)*, are shown in the accompanying table. The Winkler method is the customary iodine-caustic titration; the Sanders, an iodin-thiosulphate titration with the addition of iodate *(3)*.

A study of the table reveals a lack of uniformity in the difference in results of the two testing methods according to conditions. The widest difference in per cent combined, 0.41 per cent, covers a freshly reclaimed acid as shown in the first group of tests. A close second, 0.39 per cent, covers a freshly prepared limestone tower acid as shown in the third group of tests.

These large differences are due to errors from the caustic titration of the Winkler Method. Oeman *(4)* proved that fact as far back as 1915, when he showed that the methods of Winkler and Hohn, then universally accepted, may give very large errors due to the caustic titration involved. Oeman further showed that the iodine titration gave exact values.

The sources of the errors in the caustic titration, Oeman found, were organic acids in the liquid relief from the digesters, and in carbon dioxide resulting from the action of the acid and gas on the limestone in the towers, the carbon dioxide formed being somewhat soluble in freshly prepared sulphite acid. The presence of organic acids and carbon dioxide in sulphite acid raises the value of the free in the caustic titration of the Winkler and Hohn Methods, and reduces the value of the combined.

In spite of Oeman's findings, the methods of Winkler and Hohn have continued in use, probably for the reason that other methods, to take their place as quick control tests, were not available for some time.

Tests	WINKLER'S METHOD			SANDERS' METHOD			Difference in per cent combined in the two methods
	Per cent total	Per cent free	Per cent combined	Per cent total	Per cent free	Per cent combined	
Reclaimed cooking acid tests. (Acid containing relief gas and liquor.)	4.97	3.86	1.11	4.97	3.48	1.49	0.38
	5.08	4.07	1.00	5.08	3.67	1.41	0.41
	5.07	3.95	1.12	5.07	3.77	1.30	0.18
	5.32	4.25	1.07	5.32	4.03	1.29	0.22
Tests on cooking acid from storage tanks. (Acid containing relief gas and liquor.)	4.86	3.70	1.16	4.86	3.49	1.37	0.21
	4.63	3.62	1.01	4.63	3.60	1.03	0.02
	4.73	4.70	1.03	4.73	3.59	1.14	0.11
	4.80	3.78	1.02	4.80	3.55	1.25	0.23
	4.68	3.68	1.00	4.68	3.45	1.23	0.23
	4.66	3.65	1.01	4.66	3.62	1.04	0.03
	4.57	3.57	1.00	4.57	3.34	1.23	0.23
Tests on freshly prepared tower acid. (Acid containing relief gas.)	3.05	1.87	1.18	3.01	1.60	1.41	0.23
	3.00	1.87	1.13	3.00	1.48	1.52	0.39
	3.05	1.91	1.14	3.05	1.58	1.47	0.33

The iodine-iodate method by Sanders, however, unaffected by the errors common to the Winkler and Hohn Metthods, offers ease of manipulation and is in every way suitable as a rapid and dependable control method. The procedure for making a test of sulphite acid by this method is as follows:

1) Titrate the equivalent of 2 cc. of sulphite acid with N/16 iodine solution with starch as an indicator in the usual manner.

2) Add 20 cc. or an excess of 3 per cent of potassium iodate solution.

3) Titrate to endpoint with N/16 sodium thiosulphate. This titration should be done fairly slowly, shaking the test sample during the operation, as the reaction is a time one.

4) Multiply number of cc. of iodine solution used in titration by 0.1 to obtain per cent total.

5) Multiply number of cc. of sodium thiosulphate used in titration by 0.1 to obtain per cent free acid.

6) Subtract per cent free from per cent total to obtain per cent combined.

The following chemical reactions are involved in the making of a test.

Iodine titration

$$3H_2SO_3 + 3I_2 + 3H_2O = 3H_2SO_4 + 6HI$$

Potassium Iodate Addition

$$3H_2SO_4 + 6HI + 2KIO_3 + 10KI = 3K_2SO_4 + 6KI + 6I_2 + 6H_2O$$

Thiosulphate titration

$$6I_2 + 12Na_2S_2O_3 = 12NaI + 6NaS_4O_6$$

Literature Cited

(1) *Svensk Pappers Tidn.* 37, 754, 1934.

(2) See Schwalbe & Sieber: die chemische Betriebskontrolle in *der Zellstoffund Pap. Ind.*

(3) Not to be confused with the caustic-mercuric chloride method of Sanders.

(4) E. Oeman, Analysis of sulphite acid, *Teknisk Tidskrift*, 4 & 5, 1915.

PAPER SKETCHES

DUTCH AND SPANISH TRADERS BROUGHT WALL PAPER FROM CHINA TO EUROPE DURING THE MID-1500'S

TO CONSERVE PAPER ALL BRITISH STENOGRAPHERS ARE REQUIRED TO SINGLE SPACE DEPARTMENTAL LETTERS, USE NARROW MARGINS AND WRITE ON BOTH SIDES OF THE PAPER . . .

DURING THE HEYDAY OF EGYPTIAN PAPYRUS EACH SHEET WAS MARKED WITH A STAMP TO GUARANTEE ITS AUTHENTICITY AND VALUE.

SO SCARCE WAS PAPER IN THE SOUTH DURING THE CIVIL WAR THAT WALL PAPER ACTUALLY WAS USED IN THE PRINTING OF THE VICKSBURG (MISSISSIPPI) CITIZEN.

PAPER *Is Keystone of World Today*

▶▶▶ PAPER WEEK annually reaffirms something many people take for granted. The sixty-third conclave of the forces of the world of paper in New York last month proved again that paper is indispensable in Twentieth Century living. More than most of the products that touch our daily lives, paper reflects economic, social and political conditions of our time. In 250 years of American history, it has become a *keystone* of business, industry, and even our form of government. Remove the "paper keystone" and business could not function; many industries could not ship and distribute their products; even our democratic form of government might collapse unless a substitute for newsprint were discovered promptly.

Speaking of conventions alone, the paper industry looms as one of the most important industrial bodies that gather annually. An industry is very much alive that for a four-day period can persuade 242 mill men, 311 merchants, and 700 technical men to concentrate on the purpose of the meeting and also sponsor 69 exhibits of paper and its products.

So it was fitting that during the convention politics, economics, social trends, salesmanship and technical progress should have held the floor at one time or another. On the political front were such figures as the Honorable Herbert Hoover, John B. Kennedy, radio commentator and editor, and Kenneth Collings, war correspondent. On the social front were Dr. Frank Kingdon, head of the University of Newark, and Dr. Arthur A. Hauck, president, University of Maine. On the sales front were Veach C. Redd, small-town retailer of Cynthinia, Kentucky, for forty years; and V. E. (Sam) Vining, the Westinghouse Electric & Manufacturing Company.

Had there remained the slightest doubt of the vital importance of paper in today's scheme of living, it was dispelled by a visit to the eighth and ninth floors of the Waldorf-Astoria. The sixty-nine mill displays here exhibited would have convinced even the most dull-witted person the breadth and scope of the kingdom of paper. In these exhibits paper held sway and was shown performing its function in modern industry, business and home life—the "keystone." Writing, wrapping, packaging, sealing, printing cups, containers, towels, coat hangers, and a dozen other uses were demonstrated.

But—there were other attractions for men who perhaps eat, sleep and live with paper.

Bay West Paper Company drew a sizeable crowd of guessers who hesitated over the four P's—production, protection, profits or product. There were souvenirs of most every variety, and those who visited the exhibits went away well rewarded. Royal Paper Corporation used a different but effective system—it did not need to toll visitors, but among its sales representatives was Miss Beryl Finch, who aided in decorating the window of the exhibit room with curtains and drapes of the company's printed Cellophane wrappings.

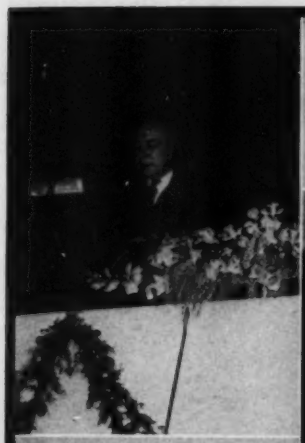
Without intent, every convention develops a keynote or a theme. This year the theme seemed to be "the world we live in today," with the usual advice of one speaker to "take it and like it." One was reminded of an incident handed down from the Nineteenth Century when an enthusiastic young writer in a current periodical said in ecstacy: "I accept the Universe!" Carlyle's comment was: "She better had!"

When turning over the affairs of the association to its new president, J. L. Riegel, Retiring President D. C. Everest in his valedictory said: "The pressure of the problems that lie immediately ahead is great. We cannot live in an unresurrected past. That is not our job. Ours is to meet the issues of our time with that courageous, imaginative spirit which has characterized the approach of those who came before."

At the annual meeting of the A. P. A. Dr. Fred W. Tanner said: "You may find a sanitary inspector in plants making paper for containers before much longer." Dr. Tanner, who is on the staff at the University of Illinois, has been working with the Institute of Paper Chemistry on the biological aspect of container paper, which has been the result of the false and otherwise unfavorable rumors, reports, and open slander during recent months about bacteria.

The SAPI luncheoneers heard Dr. Frank Kingdon head of the University of Newark, review the past four decades. He said that four major issues would decide whether the forties would bring fortune or folly to this country. These issues were: (1) Can we stabilize our economic and industrial life? (2) What is to be the relation between government and busi-

Left—John B. Kennedy, radio commentator and editor, gave a stirring address before the annual banquet of the Paper & Twine Club. At the speaker's table to his left are: W. E. Beier, president, and Stanley Andrews, secretary of the Paper & Twine Club. Right—V. E. (Sam) Vining, at right, talks with Briant Sando, of Tested Selling Institute, just before his address and demonstration of salesmanship versus peddling, at the meeting of the National Paper Trade Association.



Above—D. C. Everest, retiring president of APPA, gave one of his splendid talks before the luncheon of the Salesmen's Assn.

Below—J. L. (Larry) Riegel, newly elected president of APPA (left), talks with E. W. Tinker, new executive secretary.

Right—Dr. Otto Kress accepts award of the annual TAPPI medal, presented to him by Ernst Mahler (seated) at the annual luncheon.

Left—Charles Boyce, retiring secretary of APPA, posed with Cola G. Parker, one of the new vice presidents of the association.

Above—Dr. Frank Kingdon, president of the University of Newark, delivered an inspirational address before the SAPI luncheon.

Below—Dr. Arthur A. Hauck, president of the University of Maine, addressed the N.P.T.A. on problems of youth in securing employment today.

Right—The Honorable Herbert Hoover was a surprise speaker at the SAPI luncheon. His plea for Finland drew $1470 from the guests.

Left—E. W. Tinker, new APPA secretary, acknowledges introduction before SAPI luncheoneers in the Grand Ballroom.

ness? (3) Can we keep our individual freedom? (4) What is to be the part played by the United States in the affairs of the world?

Said Kenneth Collings, war correspondent, to the TAPPI luncheon at the Hotel Roosevelt: "The real facts of Europe today may be unpleasant, but the reporter of those facts is now. There is a difference between facts that are unpleasant (nevertheless facts) and wishful thinking. Keep out of the war or we will lose the one thing for which we enter it—democracy."

"A man who has contributed much to the paper industry and will contribute much more," said Ernst Mahler, of Kimberly-Clark Corporation, as he presented the TAPPI medal for this year to Dr. Otto Kress, of the Institute of Paper Chemistry.

The Paper & Twine Club banqueteers listened to John B. Kennedy make the assertion that "The contest between authoritarian and democratic governments has gone on for 2,000 years. Nero, known as a 'lousy fiddler,' was also an astute politician and he found the early Christians advocating more democracy than he wanted. But Nero and his government are long since gone, and the more democratic Christians are still here.

Speaking of the problems of young people today and the responsibility of business men to do everything possible to maintain their morale, Dr. Arthur A. Hauck, of the University of Maine, said: "Don't drum into the ears of young people that the best years of America are in the past." Hitler, he pointed out, first broke down the confidence of German youth in democratic institutions and the hope of a future before he "sold" them a new future of his own planning.

Said the Honorable Herbert Hoover members and guests at the SAPI luncheon: "Nothing parallels it (the Finnish situation) except the American Revolution." He said further that a Finnish officer had stated: "We would rather die on our feet than live on our knees." He spoke for four minutes.

Left—The street fakir from Billy Rose's Diamond Horseshoe puts on his act for the Paper & Twine Club. Right—A chorus charming the Paper & Twine Club banqueteers. This was voted one of the finest shows ever put on by the club.

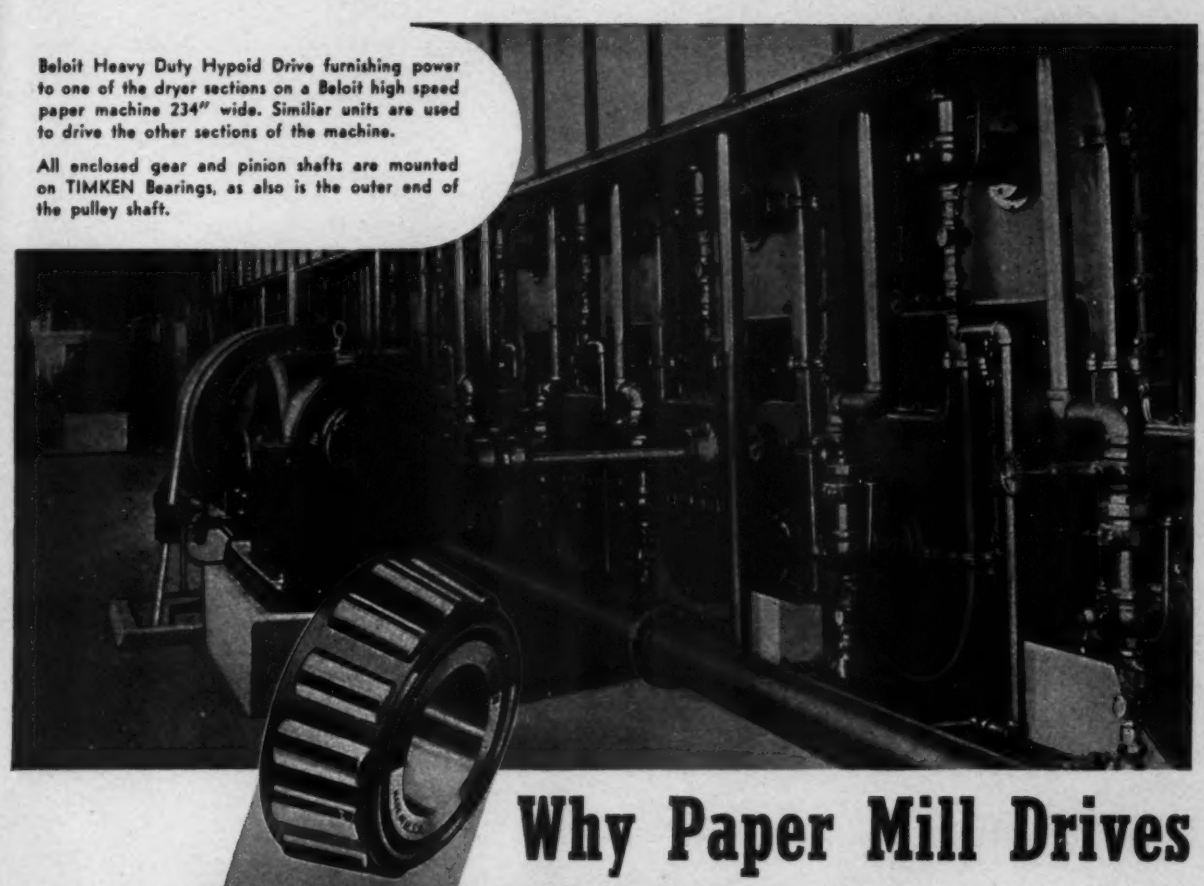
Paper men donated $1470 to Finnish relief, at a rate of about $367.50 per minute of talk. That's salesmanship on a large scale!

"The outlook for 1940 is fairly satisfactory," said F. T. Jamison, retiring president of the National Paper Trade Association, succeeded this year by P. W. Lesh, of the C. P. Lesh Paper Company. "The year may still hold surprising developments."

Said Veach C. Redd, small town hardware retailer, addressing N.P.T.A. on the Retailer's Point of View: "Salesmanship is at the lowest ebb it has seen in this country. You must help the man you sell to move the goods you sell him. I don't believe that the chief function of the wholesaler is to act as banker and merely supply stocks."

"In the electrical business," V. E. (Sam) Vining, in charge of sales training at Westinghouse Electric & Mfg. Co. said to N.P.T.A., "the jobber has been passing out and is being replaced by the distributor." He emphasized the necessity of selling "people" instead of "merchandise." He pointed to the advantages of being able to dramatize a product in the prospect's mind .... not merely describe it in cold statistics. He took, as an example, two electric flatirons. A sales girl in a department store had insisted that the one at $4.95 was the best "buy" in the store. Another at $8.95 brought forth no sales argument from her, convincing or otherwise. Nobody had told her the essential difference in these irons sufficiently dramatized to drive home the facts. V. E. Vining provided the drama. He swung the high-priced iron by its cord and pointed out that it would last the lifetime of the iron. Only the bottom heated and the top remained cool, saving on electrical consumption. Then he fried bacon and

Left—Slightly dizzy, but none the worse for the experience was Charles de Zemler, a paper-man who volunteered to let one of the skaters use him in their act. Right—This is the way a professional "swingee" has to perform to make her living.



Beloit Heavy Duty Hypoid Drive furnishing power to one of the dryer sections on a Beloit high speed paper machine 234" wide. Similiar units are used to drive the other sections of the machine.

All enclosed gear and pinion shafts are mounted on TIMKEN Bearings, as also is the outer end of the pulley shaft.

Why Paper Mill Drives Need TIMKEN Bearings . . .

TIMKEN Tapered Roller BEARING EQUIPPED

THE SYMBOL FOR MILES OF SMILES

Of the scores of different bearing applications in paper mills, none is more important nor more exacting than in gear reduction drives.

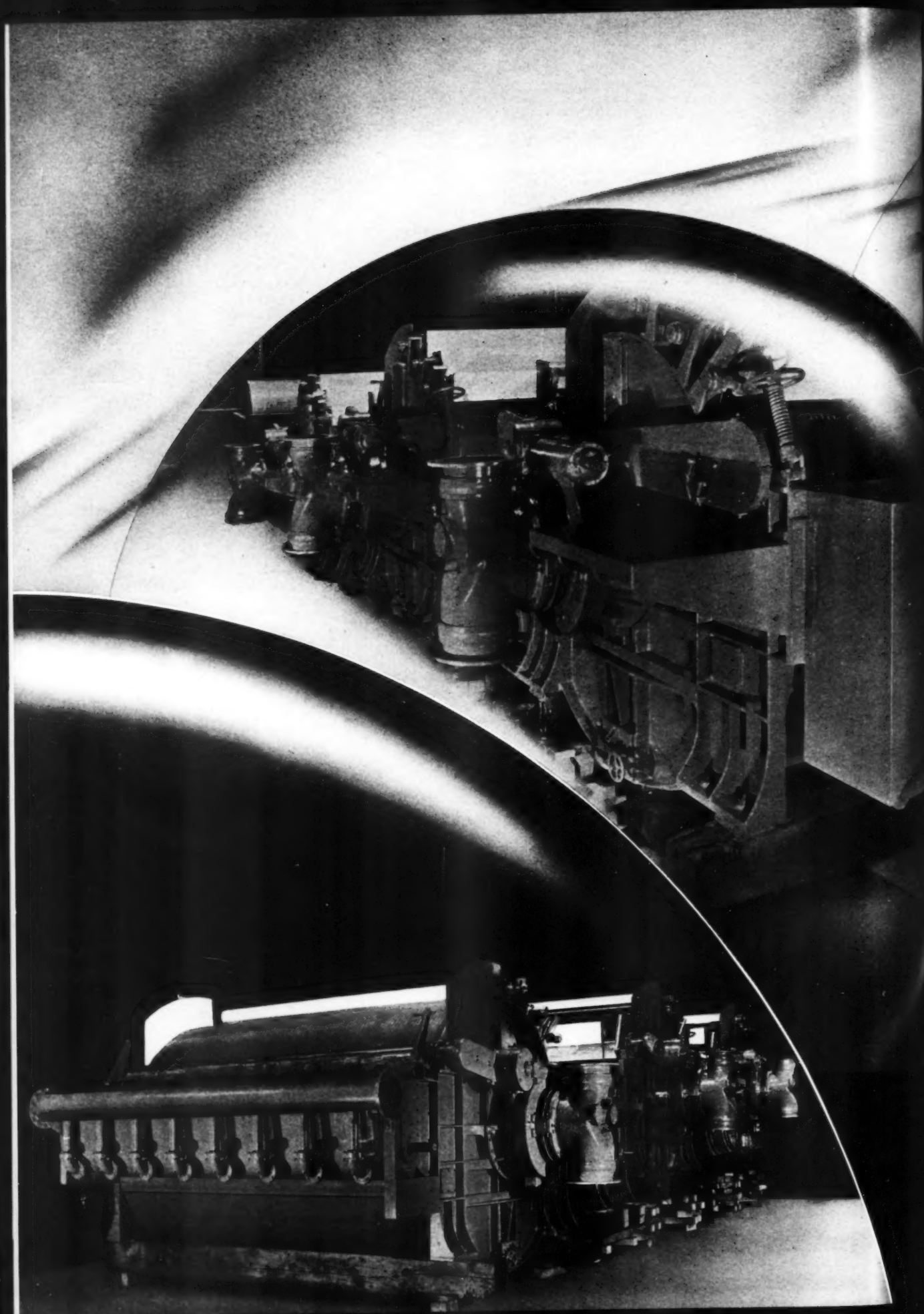
Every function which a bearing could reasonably be expected to perform is required in these units . . . friction elimination, radial, thrust and combined load capacity, protection of shafts against wear, and maintenance of moving parts in correct and constant alignment.

It takes the precision tapered construction, tremendous strength and untiring stamina of TIMKEN Bearings to meet all of these requirements as they must be met. Make sure you have them in the new drives you buy.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.

TIMKEN
TAPERED ROLLER BEARINGS



Rolling down to Mobile

Three (3) "IMPCO" 8'x12' Black Liquor Vacuum Washers for Hollingsworth & Whitney Company's new mill at Mobile, Alabama, featuring full width discharge repulpers, eliminating stock piping between Washers; system arranged for either two or three stage counter-current washing with or without soaking period after second Washer; new equipment arrangement eliminating conventional difference in elevation between Washers, is an innovation worthy of attention.

"IMPCO"

IMPROVED PAPER MACHINERY CORP. · NASHUA, N. H.

MAKERS OF THE FOLLOWING MACHINES FOR THE PAPER INDUSTRY

ROTARY AND FLAT SCREEN KNOTTERS · CENTRIFUGAL SCREENS · FLAT SCREENS WITH DUNBAR DRIVE (METAL OR CYPRESS VATS) · VACUUM FILTERS, INCLUDING SAVE-ALLS, WASHERS, HIGH DENSITY THICKENERS, LIME SLUDGE FILTERS, BLACK LIQUOR WASHERS, FORMING CYLINDERS · MULTIPLE STAGE COUNTER-CURRENT PAPER STOCK WASHERS, DECKERS, WET MACHINES, INCLUDING HYDRAULIC WITH HIGH DENSITY VACUUM WET END THORNE BLEACHING EQUIPMENT · PNEUMATIC WATER FILTERS · THE IMPCO LINE OF "IMPROVED" EQUIPMENT IS ASSISTING IN THE ECONOMICAL PRODUCTION OF QUALITY PULP AND PAPERS

A new year, but the same officers of the Advertising Men's Association. Left to right—Edson Dunbar, vice president; Richard A. Faulkner, secretary; Floyd Triggs, president; Ernest Trotter (of "Printing," who was among those present); and Maurice Park, treasurer.

eggs on the top of the cheaper iron and burned a hole in a towel because it was overheated—all within the sacrosanct walls of the Waldorf's Basildon Room. "This may have seemed like an over-acted play," he said, at the end, "but I defy any man here to ever look at an electric flatiron again and not recall frying bacon and eggs on the top of a cheap one and I defy most of you to return home without sooner or later asking your wife what kind of a woman-killing appliance you are using in your own home."

"The new certification plan on paper brands," R. H. Ziegler, assistant secretary of N.P.T.A. explained, "will put our seal of approval on brands sold exclusively to paper merchants. Then we can put it over in advertising to the customer via stuffers, automobile stickers and other means. But each brand so certified must measure up to our specifications and standards, based on regular testing laboratory findings. It will be costly, and it will take time. But the mills approve the idea and it will be worth the effort."

"Welcome to you and we hope you have a good time," said W. E. Beier, president of the Paper & Twine Club as the annual banquet got under way, with 450 members and guests gathered in the Grand Ballroom of the Waldorf.

"Pictures of the show? Certainly! Come back-stage and meet the entertainers," said secretary of the P. & T. Club, Stanley Andrews.

Flash! "You can't do that," said the man in a gray suit.

"Why not?" asked the photographer for THE PAPER INDUSTRY AND PAPER WORLD, "I have permission."

"I mean you can't take pictures of Gwen Marlowe, when she appears," said the man in the gray suit looking worried.

"Who says so?" demanded the photographer.

"I'm the manager," said the man in the gray suit.

"Why are you worrying about Gwen Marlowe?" asked the photographer.

"I'm not," said the manager. "I'm worrying about the hotel. It's rumored . . say—why do I have to tell you my troubles?"

Gwen did her act, and it turned out to be a very nice dance, indeed. Then the skaters invited members of the audience to be "swung." Charlie de Zemler, Jr., of Bridgewater Paper Company accepted. Dizzy or not, when it was over, he could still seize the microphone and shout: "Remember folks, Brightwater Bond is the best."

That's a combination of publicity and salesmanship with entertainment.

"Where's Thelma Moore?" roared men at several tables. Thelma had been singing songs, to them, and with them, accompanied by her accordion. Where was she? Why over at the table with the reporter and photographer of THE PAPER INDUSTRY AND PAPER WORLD drinking coffee. Yes, "believe it or not," it *was* coffee.

But with all the things that never had happened before and will not happen again, at least, in exactly the same way, there is the steady routine that makes a convention move smoothly and efficiently. Mrs. Rogers keeps watch at the A. P. P. A. desk, but now it is for E. W. Tinker, the new secretary, instead of Charles Boyce, resigned. Miss Shepard, at N.P.T.A. desk knows all the paper merchants by name and sight. Over at the Hotel Roosevelt at the TAPPI dask, there is a long-familiar face missing. Miss Blair has resigned to go to California. But Mrs. Woods is a very pleasant and attractive person to answer foolish questions until you run out of them. So, some of the people and events at a paper convention change and some do not, at least very often. There's the photographer flashing away, in and out of meetings, luncheons and dinners and your reporter foot-slogging over miles of Waldorf-Astoria corridor and it all might have been last year or the year before, only that what we see and report is different. But that is the wrong way to view it, after all. The theme was *"change"*. So we better take it and like it.

NATIONAL PAPER TRADE ASSOCIATION

At the thirty-seventh annual convention of the National Paper Trade Association of the United States, whose membership comprises the leading paper jobbers and merchants of the country, held simultaneously with that of the American Paper and Pulp Association in the Waldorf-Astoria Hotel, New York, on February 19-22 inclusive, Perry W. Lesh, of the C. P. Lesh Paper Company, Indianapolis, Indiana, was elected president for 1940, succeeding F. T. Jamison, of the Interstate Cordage and Paper Company, Pittsburgh, J. H. Brewer, of the Storrs & Bement Company, Boston, was elected vice president in charge of the Fine Paper Division; C. E. Roach, of the Capital City Paper Company, Springfield, Massachusetts, vice president in charge of the Wrapping Paper Division; C. W. Vernon, of Vernon Bros. & Company, treasurer, and A. H. Chamberlain, executive secretary.

The convention was one of the most successful and well attended in the long history of the paper merchants organization. Prominent speakers who addressed the convention included Dr. Arthur R. Hauck, president of the University of Maine, who discussed the findings of the American Youth Commission of the American Council of Education, which emphasized the importance of maintaining the morale of American youth as the essential factor in national survival and progress; Paul T. Truitt, of the U. S. Department of Commerce, who explained how the growing tendency toward economic isolation by States and municipalities, together with legal restraints to free trade by special taxes and licenses, are hampering the free flow of commerce; V. E. Vining, of the Westinghouse Electric & Mfg. Company, who delivered a dynamic pep talk on human behavior and what makes people buy goods, and J. K. Javits, counsel for the Association.

APPLETON *Felts*

Make GOOD *Paper..*

APPLETON WOOLEN MILLS, APPLETON, WIS.

A.P.P.A. Annual Meeting

Reviews Past . . . Looks to Future

▶▶▶ OPPORTUNELY OCCURRING at a time marked by a shrinkage in activity in the industry following a period of all-time high demand for and production of paper and paperboard, the sixty-third annual convention of the American Paper and Pulp Association and affiliated organizations in the Waldorf-Astoria Hotel, New York, on February 19 to 23 inclusive, attracted an exceptionally large attendance.

Paper, board and pulp mill executives, technicians, salesmen and other officials from various sections of the United States and Canada flocked to the metropolis to participate in the more than three-score sessions which made up the five-day convention. Interest and enthusiasm was never more pronounced at a paper industry yearly gathering.

John L. Riegel, newly elected president of the American Paper and Pulp Ass'n.

John Lawrence Riegel, of the Riegel Paper Corporation, New York City, was elected president of the American Paper and Pulp Association at the meeting of the Board of Governors of that parent body on the afternoon of Wednesday, February 21, immediately preceding the annual open meeting of the A. P. P. A. in the Astor Gallery of the Waldorf-Astoria. Mr. Riegel succeeds D. C. Everest, of the Marathon Paper Mills Company, Rothschild, Wis., who stepped down after serving his second tenure of office as chief executive of the Association. The following A. P. P. A. vice presidents were elected for 1940:

D. K. Brown, Neenah Paper Company, Neenah, Wis.

Hugh J. Chisholm, Oxford Paper Company, New York City.

R. J. Cullen, International Paper Company, New York City.

D. C. Everest, Marathon Paper Mills Company, Rothschild, Wis.

R. K. Ferguson, St. Regis Paper Company, New York City.

Ralph A. Hayward, Kalamazoo Vegetable Parchment Company, Parchment, Mich.

W. B. Merlin, Hollingsworth & Whitney Company, New York City.

John R. Miller, West Virginia Pulp and Paper Company, New York City.

W. Irving Osborne, Cornell Wood Products Company, Chicago, Ill.

Cola G. Parker, Kimberly-Clark Corporation, Neenah, Wis.

Norman W. Wilson, Hammermill Paper Company, Erie, Pa.

Vertress Young, Gaylord Container Corporation, St. Louis, Mo.

J. D. Zellerbach, Crown-Zellerbach Corporation, San Francisco, Calif.

E. W. Tinker was named executive secretary to succeed Charles W. Boyce, who resigned after serving the Association as secretary for eleven years to enter the industry with the Northwest Paper Company, Cloquet, Minn.

Opening the general meeting, President Everest announced the election of Mr. Riegel to the presidency and introduced the new president. Mr. Riegel spoke briefly, expressing his appreciation to the members of the Association for the honor bestowed upon him. President Everest also introduced Mr. Tinker, the new executive secretary, who stated he hoped to carry on the work of the Association in the same highly efficient manner as his predecessors.

President Everest then read a message to the convention from the President of the United States, as follows:

"My hearty greetings to all who attend the sixty-third annual convention of the American Paper and Pulp Association. I trust that the gathering will be a successful one, fruitful of wise counsels and constructive action in approaching the problems of conservation and distribution of the highly essential commodities with which your Association deals.

"Very sincerely yours,

"Franklin D. Roosevelt."

President Everest also read a message from W. Gibson Carey, president of the Chamber of Commerce of the United States.

President Everest delivered his annual address, as follows:

"Because 1940 is the 250th anniversary of paper manufacture in the United States, the temptation is strong today to review the accomplishments of the industry. Succeeding generations of artisans lifted paper making from the art and welded it into an industry which today in all of its ramifications ranks 7th among American industries. This is an accomplishment of which we can be exceedingly proud.

"In the light of our present knowledge and development we are apt to deprecate

D. C. Everest, retiring president of the American Paper and Pulp Ass'n.

the accomplishments of those who preceded us. Today we have tools, the tools of research and the tools of equipment. Our predecessors had none, they began by simple hand methods. By hit or miss invention, some of it I believe inspired, tools were created and with them the industry developed.

"The original use of paper was relatively insignificant. There was no ready-made market such as existed for textiles, for lumber, for metals, and for other products. Paper was not an essential then. It was purely a luxury available only to a few. It played little part in the every-day affairs of men.

Your CALENDER DESERVES THE BEST

The Textile-Finishing Machinery Co.

New York Office
50 Church St.

Providence, R. I.

Southern Office
Johnston Bldg., Charlotte, N. C.

"No one can view our tremendous consumption records and the infinite diversity of paper use and fail to realize its essential character today. It holds our civilization and industries together. One can scarcely imagine now any human activity, especially in the United States, that does not in some way depend upon paper.

"This transformation from a luxury to an indispensably essential product is an accomplishment of our industry. The process is still going on. New uses are constantly being developed and the consumption of established uses is increasing rapidly. No other old industry has exceeded the 1929 production record, or employment record for that matter, so many times as has the paper industry.

"We honor the pioneers and the developers of this industry. We glow with pride when we look back to the fathers and

E. W. Tinker, who has been appointed executive secretary of the APPA.

the grandfathers of many in this room today who contributed to its development. May we in our turn with our tools add as much to our ageless industry.

"The pressure of the problems that lie immediately ahead is great. We cannot live in an unresurrected past. That is not our job. It is to meet the issues of our time with that courageous, imaginative spirit which has characterized the approach of those who came before.

"There is no need of reviewing our present situation, or what has happened since the beginning of the European War. The flood of orders, the pyramid of production, the threat to European pulp supplies, the re-opening of export markets, these and other things create an immediate situation with far-reaching repercussions. So far we have avoided panic. We have minimized excessive speculation and we have prevented run-away prices. So far, so good.

"Our future action concerns us now. We cannot overemphasize the importance of wise and considerate action, for our position is most critical. We are faced with the necessity of meeting a temporarily expanded domestic requirement, greater to the extent that general business reacts to the demands of belligerent countries and an even more temporary expansion of exports, and at the same time maintain a position best calculated to meet the tests of post-war depression. On the one hand we are likely to be encouraged to extend our production facilities. On the other hand, we know that the facilities that we now have are likely to be too great in subsequent adjustments.

"Posed before us in unmistakable terms are correlated series of problems of extraordinary importance, by far transcending the importances of ordinary business problems with which we are familiar. Much more than company interests are at stake. In my opinion, the checks are down. We are going to bat in the clutch.

"The present market situation in which price weaknesses are appearing on a rapidly rising cost trend is wholly beside the point. We must look beyond, each of us must plan how best to serve, to meet real and implied obligations, to do our share in a greater game and to preserve our labor and capital position.

"Our immediate problem is to maintain confidence, particularly of our customers and our workers during the period of adjustment while consumption is absorbing the stocks which now exist.

"The huge backlog of orders of last fall, probably the greatest the industry ever had, could not possibly represent an actual increase in consumption of the same proportions. Although consumption did increase, only by the shearest flight of imagination could we conceive of its keeping pace with orders which exceeded in some cases by hundreds of percentages the immediately available capacity of the industry. Since late November we have been reducing the backlog. Orders have fallen off. Although a substantial industry backlog still exists, spotty conditions have appeared which are due to maladjustments between mills. The inevitable results of such conditions are apparent to all.

"Let us look at some of the underlying factors. The first and most important at the moment is wood pulp. As you know, approximately three-quarters of the wood pulp that is purchased in the United States is imported and about 60 per cent of those imports come from countries that are now either engaged in war or in the neighborhood of actual fighting. We know by the exports of the past few months that for the duration of the war we can expect little if any pulp from Central Europe. We know also that the heroic fight that Finland is making is draining almost to the last remnant the man power and labor resources of that country. Such a fight for freedom cannot be made and industrial production still be maintained. If the war continues, Sweden, Norway, Canada and the United States, in certain grades, are the only substantial pulp producers left in the world to supply the export market. My best calculations show a probable reduction in world exports of about one-third.

"At the same time, I think some of us have lost sight of the fact that our consumption of pulp since the beginning of the war has been substantially greater than ever before. This we must keep clearly in mind when we compare pulp imports since September first with those of any other period. Superficially, recent imports may seem adequate; actually they may prove to be far short of maintaining our usual reserve supply.

"Moreover, we cannot overlook immediate increases in costs of imported pulp, costs which we as consumers must pay right now. These are not only confined to the greater cargo and insurance rates but to manufacturing costs as well.

"These and other facts add up to just one thing, that the price of paper forced by costs over which we, as manufacturers, have no control, is bound to increase if the war continues. The increases must be substantial and they must take place in the near future. Price weakness now, therefore, which encourages the depletion of customer stock and which give rise to false impressions of the market, can cause serious havoc later when these cost elements take effect.

"These conditions are only in the begin-

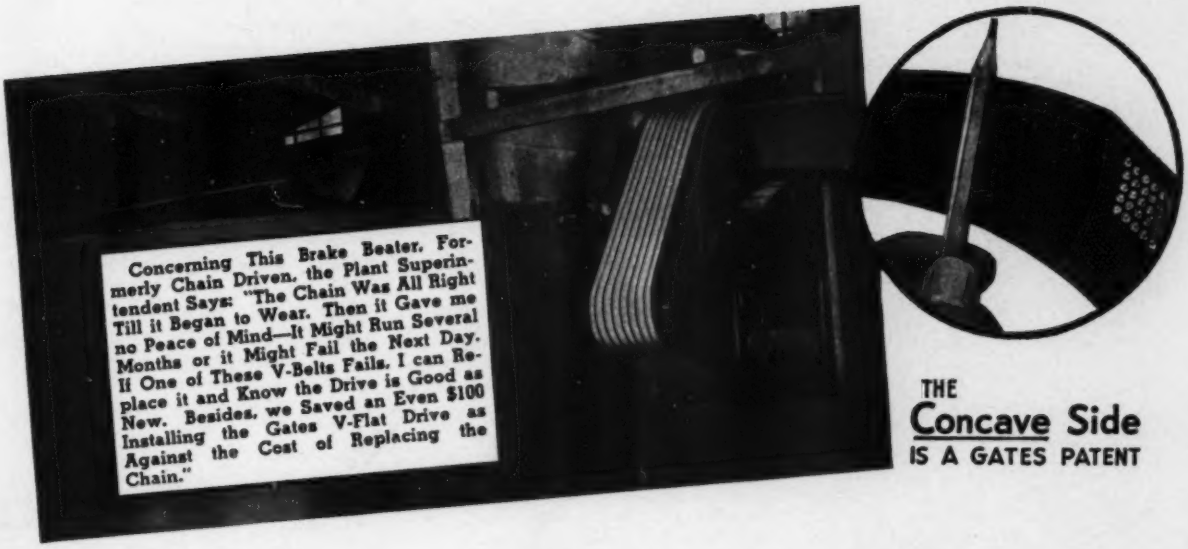
Charles W. Boyce, who leaves the Association after eleven years as secretary.

ning. I have gone into some detail with respect to them because they are indicative of a situation which can develop to what end we do not know.

"None of us may foresee the duration of the war. We cannot, therefore, adequately plan our action. We do know from experience in the first war that the situation will change rapidly, at times from day to day. Obviously, we must keep our position as liquid as possible.

"There isn't a business man in the United States who does not remember that upward spiral of economic activities that accompanied the first world war. Most business men have so far used extraordinarily sound judgment to prevent the recurrence of that condition. Because of the situation which I have just described I believe that our own position is particularly critical. We cannot absorb the increased costs that we face. They must be passed on in the price of our product. In doing so a tendency for prices to run away may develop. This must be watched with great care.

"The consequences of too high prices for paper, with which I must admit we have had little experience, are known, nevertheless, to us all. We cannot look back upon


Concerning This Brake Beater, Formerly Chain Driven, the Plant Superintendent Says: "The Chain Was All Right Till it Began to Wear. Then it Gave me no Peace of Mind—It Might Run Several Months or it Might Fail the Next Day. If One of These V-Belts Fails, I can Replace it and Know the Drive is Good as New. Besides, we Saved an Even $100 Installing the Gates V-Flat Drive as Against the Cost of Replacing the Chain."
THE
Concave Side
IS A GATES PATENT

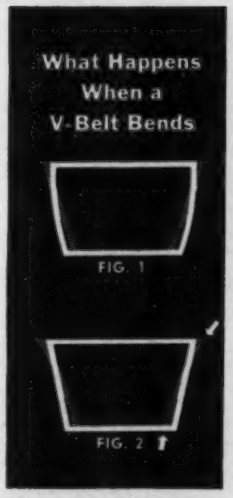
Here's a Simple Fact

Prove it for Yourself and SAVE MONEY on V-BELTS *and* POWER

Pick up any V-belt having the ordinary straight sides and bend the belt. Three things will happen, right before your eyes.

(1) The top of the belt is under tension and grows narrower. (2) The bottom is under compression and becomes wider. (3) The sides of the belt bulge out. (Figure 1, at right).

This bulging of the straight sided V-belt in its sheave-groove costs you money in two ways—(1) The bulge causes uneven sidewall wear—shorter life! (2) The bulging side cannot evenly grip the sheavewall—a loss in transmission efficiency!



V-Belt In Sheave

It's the *sides* of a V-Belt that do all the *gripping* and get all the *wear*. That's why *longer life* for the *sides* means *longer life for the belt.*

In figure 2, you see how the precisely engineered concave side of the Gates Vulco Rope exactly corrects this bulging. Two distinct savings result. (1) The Gates Vulco Rope wears evenly—longer life! (2) The entire sidewall grips the pulley—carries heavier loads without slippage: saves the belts and also saves your power!

The Gates Vulco Rope is the only V-belt built with the patented concave side.

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DENVER, COLO., 999 South Broadway DALLAS, TEX., 2213 Griffin Street PORTLAND, ORE., 333 N. W. 5th Ave. SAN FRANCISCO, CAL., 2700 16th St.

the successive waves of capacity expansion which have followed every period of high prices in our industry and fail to recognize the lesson which is so plainly written. Yet we must frankly admit that on the basis of a number of likely situations which may develop, expansion may appear extremely fascinating. The temptation may prove to be too great and another expansion wave may begin.

"The subject of our conduct during the duration of the war could not be adequately covered in a day's discussion. Moreover, we do not know enough at the moment to justify such a discussion. It is plain that to maintain the liquid condition that we must maintain, we must have available at all times dependable records of events and analyses of what these events mean. This brings me to a subject which I wish to discuss frankly with you, the status of our Associations and our use of the facilities which they offer.

As you know, I have been closely connected with the association activities in this industry for a period now of nearly 40 years. I have not only supported the association movement in this industry through dues payments, but I have given much of my personal time in its development. I think none of you can question my sincerity in respect to this subject.

"Beginning with the N. R. A., when the American Paper and Pulp Association was reorganized to its present basis, and when the divisional association structure was completed, we began a new phase of association activities which has proven its worth many times over. Yet, none of us can consider that the present status of our Associations is wholly satisfactory, not because of lack of effort on the part of the industry and staff officers, but chiefly because we are necessarily exploring new fields, creating new precedents, and pioneering new possibilities.

"But I believe now we have discovered the clue. From recent experiences we are finding that industry policy is dependent upon the conglomerate of company policy; that industry policy is worthless unless it is supported by sound company policy. With this understanding we are learning that the staff officers of our Associations are actually integral parts of each company's organization. We are learning to use their objective consideration of problems to improve, not industry policy, but company policy. We may rest assured that if company policy is sound and wise, we need not worry about industry policy.

"What does this mean with respect to your relationship with your Associations. It means first, to my way of thinking, the insistence upon adequately trained and highly intelligent association personnel. It means adequate financial support to supply such personnel with tools with which to conduct its work. It means, moreover, your confidence in your association men and their work and their confidence in you and the information you report.

"Association programs cannot be carried on without money, nor on a penny pinching basis; $100 or $1,000 more or less in dues to any company in this industry has no significance whatsoever in view of the possibilities, not only the possibilities but the necessities.

"Gentlemen, today I end my second hitch as President of the American Paper and Pulp Association. My first term of office was nearly 15 years ago. Then, the deans of the industry decided that the leadership of the Association should be placed in younger men. They first selected Norman Wilson of the Hammermill Paper Company. In 1926 the responsibility fell on me. Then, came the trying days of the depression, the hectic days of the N. R. A., the striving toward recovery. Again the deans of the industry were called upon. S. L. Willson and F. J. Sensenbrenner. Then, to my surprise, I found that I was considered a dean. Again I was called upon.

"Today, as in 1924, we are turning for leadership to young men. The Board of Governors this afternoon elected to the presidency of the association a young man in whom we all have confidence, a man who, as chairman of the Finance Committee of the Association, has known not so much the blessings of the industry as the trials of a finance chairman. You all know to whom I refer, Mr. John Lawrence Riegel, whom we call affectionately Larry."

Following President Everest's address, Ernst Mahler, chairman of the Board of the Technical Committee, reported for that committee, reviewing the year's activities.

Warren B. Bullock, manager of the Import Committee of the American Paper Industry, rendered his annual report. Major Bullock stated a general survey of paper imports since the start of the European war indicated that Allied nations are shipping to this country every pound of paper they can produce and find a market for in the United States in order to establish credits against which they can draw for purchase of war supplies.

"Standard newsprint imports for the final quarter of 1939 were the largest of the year, 50 per cent above those of the first quarter and nearly 300,000 tons larger than in the third quarter," Major Bullock said. "Imports of book and groundwood printing paper were twice those of any of the preceding quarters, and triple those of the quarter preceding the outbreak of war. Wrapping paper imports, being chiefly from Scandinavia, fell off materially, though sulphite was up to the average for the other three quarters; prices were reduced to offset the higher shipping costs. Writing paper imports fell off, but papeterie and fine tissues were up to the year's average. Paperboard imports reached an all-time high.

"Various factors have entered into the import situation. Were it not for the unprecedented demand for paper during the final quarter of the year, the import situation would have been exceedingly serious. Prices of imported paper were sharply reduced due to the depreciation of foreign currency.

"The present problems are being met by the Import Committee as they arise. The future, however, demands the most intensive study, for when the war ends there will be a deluge of imports of all kinds of paper from all countries. Every nation whose business has been dislocated by the war can be expected to strain every effort to regain lost markets. Price reduction and dumping can be anticipated, for a loss in financial return will be of much less consequence to such nations than the securing of a re-entry into American markets for commodities whose shipment was curtailed or prevented by the war. This happened before and will happen again, but on a far more extensive scale when the present war ends."

Dr. Fred W. Tanner, professor of chemistry of the University of Illinois, spoke on biological investigation in the paper and pulp industry. Dr. Tanner, speaking ad lib, discoursed interestingly on the sanitary aspects of paper and paperboard.

While the United States Justice Department plans no widespread drive against trade associations as such, when the department has evidence of illegal conduct by such associations it will act vigorously, Wendell Berge, special assistant to the Attorney General of the United States, asserted in an address outlining the position of trade associations in relationship to anti-trust laws.

Mr. Berge emphasized in his address that the Anti-Trust Division of the Justice Department cannot require business to adopt any particular course of conduct. "We do not tell business what to do," he said. "We indicate through our prosecution policy what it cannot do, leaving open for the free exercise of individual choice the wider area of business activity."

This, he insisted, is to the advantage of business, "because it permits business men a maximum of freedom," and added that, through the traditional device of consent decrees, business men may propose constructive solutions of their problems and secure judicial approval before embarking upon otherwise uncertain courses.

The importance of maintaining free competition in the United States, Mr. Berge said, has become increasingly apparent with the rise of European dictatorships. There is no major country living under political dictatorship today, he said, where individual enterprise has not disappeared. He added that, while one might argue as to which is cause and which is effect, we do know that in Germany there was a progressive abandonment of competitive enterprise in favor of cartelization for years before Hitler seized power. In other countries, substitution of rigid cartels for free competition preceded the rise of the dictators.

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For the Paper Industry

Cotton Rolls
Cotton and Wool Rolls
Interleaved Rolls
Paper Rolls
Embossing Rolls
Chilled Iron Rolls
Granite Press Rolls
Glassine Supercalenders
Web Supercalenders
Friction Calenders

Sheet Calenders
Embossing Calenders
Plating Calenders
Laboratory Calenders
Burnishing Calenders
Ventilating Fans
Rag Cutters
Stock Cutters
Paper Dampeners
Tensile Testers

Mullen Testers

TAPPI Celebrates

Its Silver Anniversary

▶▶▶ ON THE SAME DAY OF THE MONTH that the Technical Association was organized twenty-five years ago, TAPPI opened its twenty-fifth annual meeting. The organization was effected on February 19, 1915, in the old Waldorf-Astoria Hotel in New York, while its quarter-of-a-century anniversary meeting was held in the Hotel Roosevelt, New York, February 19 to 22, 1940.

At the time of organization, the association was little more than an idea; there were few technical men in the industry at the time; and they were looked upon in some quarters, at least, with considerable misgivings. Today the association finds itself with a membership of about 1800. Most of this membership is in the United States, but there also are members in Australia, Tasmania, Belgium, British West Indies, Canada, China, Cuba, Czechoslovakia, Denmark, England, Estonia, Finland, France, Germany, Hawaii, India, Italy, Japan, Lithuania, Mexico, Netherland East Indies, Netherlands (Holland), New Zealand, Norway, Peru, Philippines, Poland, Scotland, South America, Sweden, Switzerland and the U. S. S. R.

From just an idea twenty-five years ago, the association has grown into an international body that has contributed, is contributing and no doubt will continue to contribute in an ever-increasing degree to the technical advancement of the pulp and paper industry.

F. C. Clark, consulting engineer, Newton, Massachusetts, and retiring president of TAPPI, addressed the general session which opened the twenty-fifth Annual Meeting. Commenting upon the Silver Anniversary of the association, he stated that there is deep satisfaction in what has been accomplished; that the present large meetings, although not conducive to intimate discussions as were the meetings of early days, are much like post-graduate seminars. Mr. Clark cited the progress made by the association as ample proof of the need for its existence, and mentioned that he looked for even greater growth of the association during the next quarter of a century.

The secretary's report, presented by R. G. Macdonald on the morning of February 19 at the general session, indicated that last year was one of progress for the association. In this report also were entered the names of those TAPPI members who had passed on since the last annual meeting. Mr. Macdonald, likewise, mentioned briefly the successful 1939 fall meeting that was held in Syracuse, New York, and called attention to the 1940 fall meeting to be held on August 20-23 at Seattle, Washington. Mr. Macdonald, likewise, related that revised Volume V of the *Manufacture of Pulp and Paper* was published during the year by McGraw-Hill Book Company, and that a new publication of TAPPI, the *TAPPI Data Book*, made its appearance during the past year.

Dr. L. T. Stevenson, manufacturer's agent, New York City, reporting at the same general session for the Tellers Committee, announced the election by letter ballot of W. H. Swanson, staff superintendent of sulphite, Kimberly-Clark Corporation, Kimberly, Wisconsin, to the presidency of TAPPI, and R. A. Hayward, president, Kalamazoo Vegetable Parchment Company, Parchment, Michigan, to the vice presidency. The election of the following members of the executive committee also was announced by Dr. Stevenson:

Albert Bankus, vice president, Crown Zellerbach Corporation and Crown Willamette Paper Company, San Francisco; G. L. Bidwell, Jr., assistant superintendent, Riegel Paper Company, Milford, New Jersey; Merle Chaplin, president, Chaplin Corporation, Portland, Maine; J. L. Parsons, Research Chemist, Hammermill Paper Company, Erie, Pennsylvania.

▶▶▶ After several other committee reports, the general session was given over to the presentation of three papers: namely, "Relationship between Employees and Management in the Paper Industry," R. A. Hayward, president, Kalamazoo Vegetable Parchment Company, Parchment, Michigan; "The Trend of the Newsprint Industry in the United States," G. D. Bearce, manager, Maine Seaboard Paper Company, Bucksport, Maine; and "Our Patent System," C. W. Rivise, patent attorney, Caeser & Rivise, Philadelphia.

These three papers which completed the program of the general session on the morning of the first day of the convention, likewise were the first papers on a four-day program which included the presentation of about ninety papers.* All of the papers, other than the first three already mentioned by title and author, were presented in group meetings.

There were three group meetings during the afternoon of February 19—a water session, an acid pulping and heat and power session, and a paper testing session.

The papers scheduled for presentation before the *Water Session* group included the following:

"Function of pH in Water Treatment," by C. E. Imhoff.

"The Rayonier Fernandina Water Treatment Plant," by E. Nordell and C. Richheimer.

"Some Aspects of White Water Flocculation," by E. N. Poor.

"White Water Flow Measurements," by R. R. Fuller.

"Effect of Water Hardness on Formation of Floc from Sodium Aluminate," by L. B. Miller.

"Survey of Paper Mill Water Requirements," by the TAPPI Water Committee.

Six papers (one of them by title) were scheduled for the *Acid Pulping and Heat and Power Session*. They were:

"A Time-Temperature Control for Sulphite Digesters," by J. F. Inderdohnen.

"The Coloring Matter of Sulphite Liquor," by L. E. Simerl.

"The Wallin and Svensson Circulating System," by Sven Fahlgren.

"Effect of Acid Concentration on the Temperature Schedule," by G. H. Chidester and J. N. McGovern.

"The Economical Disposal of Waste Sulphite Liquor," by G. H. Tomlinson and L. S. Wilcoxson.

"Evaluation of Pulpwood," by J. V. Martin (By title).

The program of the *Paper Testing Session* included the following papers:

"The Photoelectric Determination of the Permeability of Paper to Fluids," by H. L. Vincent.

"The Terephthalic Method for the Determination of the Total Acidity of Paper," by B. L. Browning and G. C. Kimble.

"Subcommittee Developments in Paper Testing—(a) Hydrogen Ion

*Abridgments of these papers, insofar as possible, will be published in THE PAPER INDUSTRY AND PAPER WORLD.

POWELL BRONZE VALVES

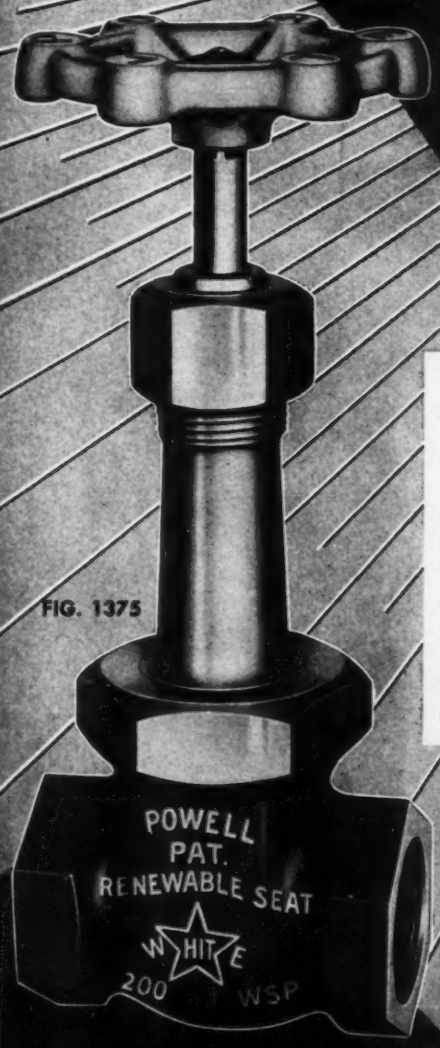

FIG. 1375

It's a serious matter, both costly and annoying, when a busy plant has to shut down for valve repairs . . . That's why it pays to use Powell service-tested valves for steam, water, air, gas, and oil lines . . . The seats and discs can be renewed—the valves repacked under pressure without disconnecting them from the pipe line . . . On your next order specify POWELL

FIG. 99

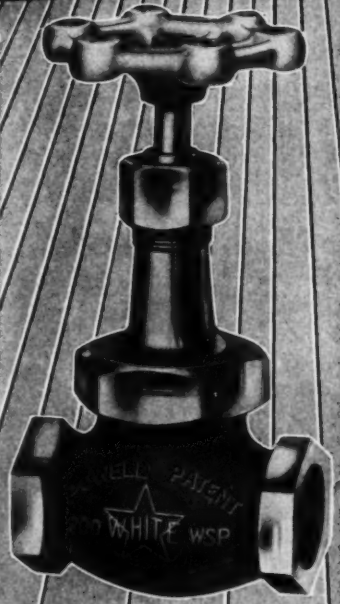

FIG. 1708

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

Concentration and Pentosans, by P. F. Wehmer, and (b) Water Vapor Permeability," by G. J. Brabender.

▶▶▶ Five group meetings were held on February 20, two in the morning and three in the afternoon. The morning meetings included a coating session and an alkaline pulping session; the afternoon meetings, a non-fibrous materials, preparation and testing session, an alkaline pulping and pulp purification session, and a microbiology session. These five group meetings accounted for thirty-one papers, only two of which were scheduled for presentation by title.

The titles of these various papers and the authors of them follow:

Coating Session—

"Laboratory Evaluation of Paper Coating Raw Materials," by C. G. Landes.

"Effects of the Wettability of Paper Coating Raw Stock," by Glenn Davidson.

"Manufacture of Casein," by W. E. Stringer.

"An Evaluation of Calcium Carbonate Coating Colors Formulated with Various Adhesives," by H. F. Roderick and A. E. Hughes.

"Methocel — Properties and Suggested Uses in the Paper Industry," by F. C. Peterson.

Alkaline Pulping Session—

"Sulphate Pulping of Douglas Fir," by M. W. Bray, S. L. Schwartz and J. S. Martin.

"Circulation and Storage of Kraft Pulp," by G. A. Petroe.

"The Theoretical Basis for the Action of Sulphide in the Kraft Pulping Process," by F. S. Hanson III.

"The Application of Synthetic Salt Cake," by W. L. Savell.

"Bleached Sulphate Cylinder Papers," by A. B. Moore, Jr.

Non-Fibrous Materials, Preparation and Testing Session—

"Analysis of Rosin-Wax Sizes," by R. B. Porter and W. M. Thomas.

"Analysis of Size," by E. A. Georgi.

"Use of Sodium Chlorite in Bleaching," by M. C. Taylor, J. F. White and G. P. Vincent.

"The Effect of Clay Characteristics on the Calendering of Sheets," by B. W. Rowland and H. J. Allison, Jr.

"The Colloidal Nature of Clays with Reference to Papermaking," by B. W. Rowland.

"Retention of Fillers," by S. W. Martin and W. R. Willets.

"Statistical Survey of Rosin Size in the Paper Industry," by P. K. Baird and C. E. Curran (By title).

TAPPI's new president is W. H. Swanson

Alkaline Pulping and Pulp Purification Session—

"Relation of Lignin Content to the Strength of Paper and Boards," by C. V. Holmberg and E. C. Jahn.

"Tall Oil," by H. L. Blengsli.

"Design of Gas Absorption Equipment for the Production of Chlorine Water," by R. P. Whitney and J. E. Vivian.

"A New Approach to the Permanganate Number Test," by R. R. Fuller.

"Determination of Bleach Requirement of Wood Pulp," by C. M. Koon.

"Comparison of the Cooking Stain Method and Chemical Methods for Determining the Bleachability of Pulp," by J. Graff and J. F. Hechtman.

"Review of Bleaching Literature," by D. T. Jackson and J. L. Parsons (By title).

Microbiology Session—

"Microbiological Control in Paper and Pulp Manufacture," by R. B. Martin and A. E. Griffin.

"Microbiology of Pulp and White Water," by H. K. Nason, R. S. Shumard and J. D. Fleming.

"Significance of Bacterial Control," by C. M. Baker.

"Promoting Satisfactory Bacteriological Conditions in the Paper Mill," by R. F. Huntley and R. H. Torrey.

"Routine Determination of Bacterial Content of Paper," by L. C. Cartwright and S. S. Epstein.

"Spore Germination of Bacteria Commonly Found in Paper and Paper Products," by R. S. Breed (Motion Picture).

"The Relation of Starch to Microbiological Problems in the Paper Mill and Methods of Controlling Bacterial Growth," by A. Frieden (By title).

▶▶▶ The group meetings of February 21, the third day of the convention, were arranged in the same manner as of the day before, two in the morning and three in the afternoon. The morning meetings included a coating, graphic arts and optical properties session, and a materials of construction session; the afternoon meetings, a container session, a heat and power session, and an optical properties session. The titles and authors of papers presented before the *Coating, Graphic Arts and Optical Properties Session* were as follows:

"The Velo Cold Set Process in Printing and its Relationship to Paper," by F. G. Breyer.

"Dimensional Changes in Paper," by H. W. Bialkowsky and T. R. Probst.

"Effect of Atmospheric Humidity on Newsprint," by G. D. O. Jones.

"Product Planning in the Glazed and Fancy Paper Industry," by G. B. Tallman.

"The Psychophysics of Color," by E. R. Laughlin and I. H. Godlove.

"Methods of Designating Colors," by D. B. Judd.

On the program of the *Materials of Construction Session* were the following papers:

"Manufacture and Use of Fourdrinier Wire," by D. C. Dilley.

"Welding of Stainless Steel," by E. W. P. Smith.

"Corrosion Resistant Alloy Lined Vessels for the Paper Industry," by M. A. Scheil.

"Paper Mill Construction," by H. K. Ferguson and G. W. Dodge.

"Survey of Kraft Mill Construction Materials," by J. A. Lee.

In addition to the papers, the program of the Materials of Construction Session also included a discussion of packing material.

Three individual papers and an adhesives symposium of four papers constituted the program of the *Container Session*. The papers included in the adhesives symposium were as follows:

"How the Properties of Adhesives Are Related to the Properties of Paper Surfaces," by F. Camps-Campins.

"The Evaluation of Strength Characteristics of Corrugated Boxes," by D. M. Hawley.

"Influence of Paperboards and Adhesives on the Strength Properties of Corrugated Fiberboards," by D. W. McCready.

"Performance of Sodium Silicate Adhesives in the Manufacture of Corrugated Fiberboard," by F. R. Boller, J. G. Lander, and R. Morehouse.

The remaining three papers of the session were:

"Bending Tests of Corrugated Boards," by T. A. Carlson.

Stretching and inspecting Fourdrinier wires are two of many operations at Lindsay that call for extreme care and thorough training.

A 1200-foot motion picture has been prepared by the Lindsay staff. It traces the manufacture of Fourdrinier wires from the receipt of the raw materials to the shipping department. The entire picture is popular in style, and so is the flexible story that accompanies it. Its appeal, however, is to technical and other practical men, especially to the personnel of companies engaged in paper-making...The Lindsay picture is available to a few groups that are interested.

THE LIND[illegible]IRE WEAV[illegible]COMPANY

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Lindsay **WIRES**

FOR PAPER MILLS

"The A. S. T. M. Container Testing Program," by Don. L. Quinn.

"Preventing Oxidation and Rancidity in Paper with Oat Flour," by Sidney Musher.

The program of the *Heat and Power Session* included six papers:

"Radiant Heat Drying of Paper," by R. W. K. Ulm.

"Drying Rates for Pulp," by L. G. Green.

"Recovery Unit Performance in Burning Kraft Process Black Liquor," by L. S. Wilcoxson and G. F. Ely.

"Recovery of Heat in Sulphite Mills," by W. H. Kraske.

"The Dowtherm System," by Pell Foster.

"Centralized Lubrication," by G. K. Kauffeld.

The *Optical Properties Session* was held as a joint meeting with the Inter-Society Color Council, the meeting being divided into two parts—one covering a survey of instruments, and the other relating to the use of instruments. Papers scheduled under the Survey of Instruments portion of the program included Spectrophotometers, by K. S. Gibson, and Abridged Spectrophotometers, by J. A. Van den Akker; while those under Use of Instruments consisted of the following:

"Pulp," by R. S. Hatch; "Beater Furnish," by G. S. Greisheimer; "Uncoated Paper," by M. N. Foote; "Coated Paper," by W. J. Foote.

The morning of February 22, the last day of the convention, was given over to two group meetings and to a meeting of the Inter-Society Color Council. Of the two group meetings, one was a session on forming and finishing; the other, a session on coating and new products.

The program of the *Forming and Finishing Session* included six papers. These papers and their authors were as follows:

"The Stream Flow Vat System," by P. H. Goldsmith.

"The Dieckbrader Vacuum Deckle for Cylinder Machines," by A. Yraola.

"Effect of Alum on Sheet Properties," by E. L. Keller, F. A. Simmonds, and P. K. Baird.

"The Relation of the Strength Properties of Multi-Ply Paper Board to the Bonding Between Plies," by D. S. Brown.

"The Relations Between Sheet Strength and Fiber Surface Conditions," by H. P. Dixon, Jr.

"Consistency Regulators," by Frederick Wierk.

Six papers also were on the program of the *Coating and New Products Session*. They were:

"Prosize," by B. W. Rowland and W. M. Bain.

"New Interpretation of the Structural Aspect of the Paper Sheet," by G. E. Landt and S. A. Rulon.

"Developments in Synthetic Resins and Resin Emulsions," by F. J. Myers.

"Plastics and Chemicals from Wood," by R. M. Boehm.

"The Flocculation and Dispersion of Papermaking Fibers," by A. Erspamer.

"The Decrease of Felt Life Due to Bacterial Action," by J. P. Weidner.

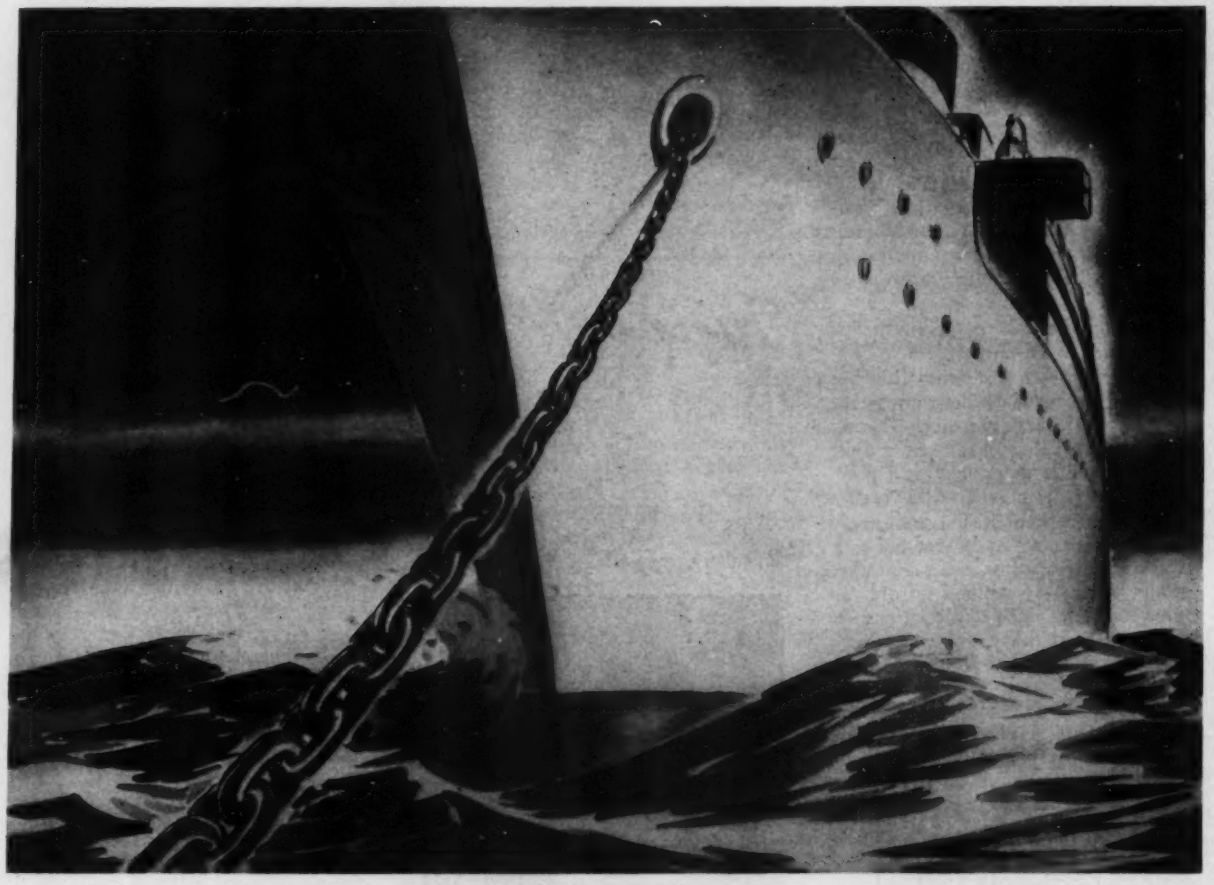
LUNCHEON MEETING

▶▶▶ The convention was brought to a close with the annual luncheon. This affair through the years has come to mean the high point of all the convention proceedings and this year was no exception to the rule.

Kenneth Brown Collings, war correspondent, author, and aeronautical authority, was the guest speaker for the occasion. Mr. Collings was *"Liberty's* flying correspondent in Ethiopia;" he was a co-author with Lowell Thomas of "With Allenby in the Holy Lands;" and he was one of the few correspondents admitted to Germany after the outbreak of war.

"What Is Really Happening in Europe" was the subject of Mr. Collings' talk at the luncheon. In his remarks, he made it clear that he was a reporter of facts, and as such, he made no effort to pull the punches. He revealed a maze of contradictions and paradoxes in the current international crisis and pleaded in his concluding remarks for the United States to make every effort to remain neutral in this crisis.

OPACITY • WHITENESS • BRIGHTNESS



TITANOX Is Like a Strong Chain that Holds a Ship to Safe Anchorage

WHEN we speak of TITANOX, we refer not only to the pigment, but also to the tangible and intangible benefits derived from its use. Each benefit is a link in the cable that joins pigment producer and paper maker with a bond that makes for satisfaction and success. Let us picture the various links.

The anchor is the manufacturer, big and sturdy, that will not drag in any weather. From it start the links of uniformity, quality and adaptability, which represent production. Then follow the links of sales, delivery and availability which have to do with keeping customers supplied with required pigment.

Qualified salesmen, technical service and help in practical utilization form the next group of links, marking the cooperation between pigment producer and consumer. Finally there are the links of progressive company policy as represented by the service laboratories and research laboratories.

Every link in this TITANOX chain is sound and strong. We offer it to makers of all types of paper.

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TITANOX

TRADE MARK

Following the address of Mr. Collings, the TAPPI medal for 1940 was presented to Dr. Otto Kress, technical director, Institute of Paper Chemistry, Appleton, Wisconsin. The presentation was made by Ernst Mahler, vice president, Kimberly-Clark Corporation, Neenah, Wisconsin.

After the presentation, D. C. Everest, president and general manager Marathon Paper Mills Company, Rothschild, Wisconsin, and retiring president of the American Paper and Pulp Association, related some interesting observations about the growth of TAPPI.

Quoting directly from his remarks, Mr. Everest stated, in part:

"From a small beginning this has grown to be one of the most important associations in the industry. During your existence there has been greater improvement in equipment and processes than in any previous fifty years.

"You have been the cause of more headaches for your employers and your employers' competitors than any other group. You have stepped up old obsolescence and made depreciations reserves look like thirty cents. With each period of stress either from war or depressions following wars, you have made new developments which have become common practice. What you will do during the current war period, which in my opinion will be longer than any previous one we have known about, no one knows. The uses of new species of wood and other materials are well within the possibilities if the shortage of pulp becomes sufficiently acute.

"Out of this organization will come something which will be upsetting to many, but in the long run will work for our economic good. I wish to extend my sincere good wishes for another twenty-five years of glorious achievement.

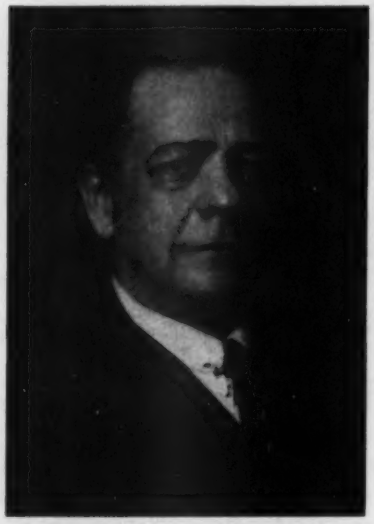
"While this year ends my official connection with the American Paper and Pulp Association, I hope that TAPPI and the American Paper and Pulp Association may continue for many years their co-operative work which has served to keep this industry on its toes and to make the progress it has in the last twenty-five years."

The last speaker on the luncheon program was Harry Fletcher, vice president and general manager of the Fletcher Paper Company, Alpena, Michigan, and first president of TAPPI (1915-1916), who reviewed briefly the early history of the association. He mentioned that the first meeting of TAPPI was combined with a meeting of the American Chemical Society (September 23, 1915), and exhibited a copy of an issue of the *New York Journal of Commerce* of that time which gave the program of the meeting. Mr. Fletcher presented this issue to R. G. Macdonald, secretary-treasurer of TAPPI, for inclusion in the Memory Book of the association. He also presented Ernst Mahler, vice president and general superintendent, Kimberly-Clark Corporation, Neenah, Wisconsin, with a sample of Alpena pulp that was awarded a Gold Medal at the World's Columbian Exposition (1893). This pulp was for the archives of the Institute of Paper Chemistry, of which Mr. Mahler is considered the founder.

Before bringing the twenty-fifth annual meeting of the Technical Association of the Pulp and Paper Industry to a close, an invitation was extended to all TAPPI members and friends by Robert B. Wolf, manager of the pulp division, Weyerhaeuser Timber Company, Longview, Washington, to attend the 1940 fall meeting of TAPPI at Seattle, Washington. Remember the dates—August 20-23, 1940.

Tappi Medal TO DR. KRESS

▶▶▶ ONE OF THE HIGHLIGHTS of the TAPPI program each year is the presentation of the gold medal which is awarded annually by the Technical Association. This year the honor was conferred upon Dr. Otto Kress, technical director of the Institute of Paper Chemistry, Appleton, Wisconsin.



Dr. Otto Kress

It was quite fitting that the presentation should be made by Ernst Mahler, vice president of the Kimberly-Clark Corporation, Neenah, Wisconsin. Mr. Mahler is considered the founder of the Institute at Appleton, with which Dr. Kress is associated, and in his presentation address he brought out that Dr. Kress is one of his old friends and that they have collaborated in one capacity or another for nearly thirty years. He also touched upon some of the high points in the career of Dr. Kress thus far.

In this connection, Mr. Mahler stated that Dr. Kress received the degree of Bachelor of Science and the Illig medal in 1906, from Columbia University; that he continued with postgraduate work, acting as private assistant to the eminent Dr. Chandler and three years later receiving the degree of Doctor of Philosophy; that after a few years with the Badische Company he joined the staff of the Forest Products Laboratory in Madison, Wisconsin; that in 1918 he was employed directly by the industry and after two years with the Consolidated Water Power and Paper Company he acted as superintendent of manufacture for the Thilmany Pulp and Paper Company until 1928, and that, one year later, he became technical director of the newly-formed Institute of Paper Chemistry.

Mr. Mahler also revealed that Dr. Kress has been a member of the Technical Association since 1915; that he has participated actively in its growth; that he has figured as author of fifty publications to date; that there are more than thirty United States and foreign patents bearing his name, and that his inspirational leadership at the Institute of Paper Chemistry is certified by the solid admiration which the students accord him and by the serious perspective which they bring to their studies and the records they are making in industry. In concluding his presentation remarks, Mr. Mahler saluted Dr. Kress personally, and on behalf of Tappi expressed sincere congratulations and wishes for a long and active career.

▶▶▶ Dr. Kress, in responding to the Tappi medal presentation by Mr. Mahler, recalled that he had been privileged by the association to make a similar presentation to Mr. Mahler in 1933. He then corroborated much of what Mr. Mahler had mentioned in reference to his career and added that he had spent one year in the employ of the du Pont Company since severing his connection with the Forest Products Laboratory.

Dr. Kress then sketched briefly the development of the Institute to the

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present date. Quoting directly from his remarks he said, in part:

"The Institute of Paper Chemistry was established through the vision of a group of Wisconsin pulp and paper mill executives who agreed to finance it for a period of five years. At the end of that period, the Institue found itself national in scope, drawing its support from mills all over the United States. As established, the Institute had and has now three primary objectives: first, the training of a limited group of students at the postgraduate level; second, the establishment of a library dealing with pulp and paper and its related fields, and third, the conducting of suitable research work both of a purely scientific nature and also of a practical nature."

"When the Institute of Paper Chemistry opened its doors in February, 1930, arrangements had been made with Lawrence College for the occupancy of rooms on the top floor of the new Alexander gymnasium, which were coverted into offices and laboratories. Naturally, this arrangement was far from ideal from the standpoint of facilities and equipment, and I was the only full-time instructor available in the field of pulp and papermaking. The class entering the Institue in February, 1930, consisted of three students, one of whom discontinued in June of that year to return to mill work; the other two completed the required curriculum, receiving the Doctor's degree after three years' attendance at the Institute."

"Today the personnel of the Institute totals eighty-eight full-time members, and the ratio of student body to faculty is approximately two to one. Our students come to the Institute from all parts of the country. At present, our student body numbers fifty-one, representing graduates of thirty-five colleges and universities. The physical assets of the Institute have also increased remarkably through the erection of the first Institute building, followed by the Kimberly Memorial Library, which was donated by Mr. J. C. Kimberly in memory of his father. As the needs of the Institute developed, the original building was enlarged to approximately twice its original floor space. In time, still additional space was required for special work, and several small buildings were erected to meet this need. At the present time, all of the available space is in actual use. From the standpoint of equipment, the Institute has splendid facilities, much of the equipment having been made available through donations. Based upon the insurance carried, the Institute figures its present assets at approximately one million dollars."

"The Institute of Paper Chemistry, which is the realization of a dream and a vision, is, of course, not the result of the efforts of any one individual. Nevertheless, much of the success of this enterprise is due to the vision of Mr. Ernst Mahler, who has served as president of the board of trustees since the establishment of the Institute and who has given unreservedly of his time, energy, and finances to assist in the development of the Institute in an orderly and progressive manner. The board of trustees, the staff, and the student body on the one hand, and the mills and allied industry for whom we are permitted to do research work on the other hand, have all contributed in bringing the Institute to its present development. It is this work in which I am at present engaged that I have found to be so satisfying, as the opportunity is presented not only to help in conducting suitable research work, but, more important, to pass on to a limited group of intelligent and interested young men the information which has been accumulated through the past ages and thus fit them for a career in their chosen field of pulp and paper manufacture."

CONVENTION SIDELIGHTS

▶▶▶ An entire floor, and then some, of the Waldorf-Astoria was taken up by the large number of exhibits by various companies manufacturing paper and paper products during the sixty-third annual American Paper and Pulp Association convention in New York. Every conceivable kind of paper was on display as well as numerous articles fashioned of paper and paperboard. Between the exhibits and entertainment by supply concerns and others, the conventionites had all their spare time fully occupied.

▶▶▶ Paper and pulp men who are graduates of the University of Maine gathered for their yearly luncheon during Convention Week at the Hotel Lexington on February 21. More than two-score were present. George Bearce, of the Maine Seaboard Paper Company, presided. Olin W. Callighan, of Edgar Brothers Company, Kalamazoo, Michigan, was elected chairman to arrange the program for next year's luncheon.

▶▶▶ The Cellulose Sales Company, Inc.; American Delthirna Corporation, and Johaneson, Wales & Sparre, Inc., served a Swedish Smorgasbord repast to their many friends in their Waldorf suite during the convention. The luncheon treat included great quantities and varieties of Swedish delicacies.

▶▶▶ The fourth annual banquet of the Paper and Twine Club in the grand ballroom of the Waldorf-Astoria Hotel on Wednesday evening proved one of the real social highlights of the convention. The event attracted close to 500. John B. Kennedy, radio commentator, gave an illuminating address to lead off an all-star floor show by topnotch Broadway talent.

▶▶▶ D. C. Everest, president of Marathon Paper Mills Company, says he has had enough association responsibility for a long time to come. After two terms as president of the American Paper & Pulp Association, once as a young man and once as a "dean," he thinks he is entitled to a rest.

▶▶▶ "Ted" Tinker, the new executive secretary of the American Paper and Pulp Association, wore a trail through the Waldorf hallways, going from one meeting to another to be introduced to the members of the various group associations.

▶▶▶ The list of the Board of Governors of the American Paper and Pulp Association for the coming year includes several new faces, indicating that the Association is substituting some of the younger mill executives for the old time wheelhorses who have controlled the destinies of the organization for so many years.

▶▶▶ Seven members of the Sisson family were given a dinner on Monday, the 19th, by the *Racquetteers,* the paper men who are entertained on an annual deer hunt in the Potsdam region. George W. Sisson, Jr., celebrated his 77th birthday, then came to the convention to help his "boys" sell paper.

▶▶▶ F. J. Sensenbrenner, the sage of Neenah, did not come to the convention this year. Cola G. Parker succeeded him on the Board of Governors of the American Paper and Pulp Association. Mr. Sensenbrenner says he is willing to let younger men be responsible for his company's association relations.

▶▶▶ "Buzz" Gibson, son of George K., first president of the Salesmen's Association, is taking an active part in the Salesmen's Association affairs—just one more paper family's son following the "old man" in the business.

▶▶▶ Alf Cadman, secretary of the Canadian Pulp and Paper Association spent the week at the convention doing his best to maintain the long peace between the mills on both sides of the border.

▶▶▶ A genial host to some paper men tried in vain to sell a bottle of milk back to the Waldorf management when it was given him in lieu of an early breakfast.

▶▶▶ R. S. Kellogg and the members of the Executive Committee of the Newsprint Service Bureau held a joint luncheon conference with the representatives of the American Newspaper Publishers Association during the week. Scripture has something to say about the lion and the lamb lying down together.

▶▶▶ L. J. Parent of the St. Croix Paper Company was among those at the convention, having recovered completely after an automobile accident which took him close to the pearly gates.

▶▶▶ An interesting display of papermaking cellulose fibers were displayed at the Waldorf-Astoria by the Brown Company. A huge chart listed the names of the company's pulps and also the types of papers in which these pulps are used. Samples of all grades were arranged below.

SUPPLY DEALERS

With an especially large number of purchasing agents and other officials of paper and paperboard mills present as guests of their raw material supplier friends, a new high record of attendance was established at the annual banquet of the New York Association of Dealers in Paper Mill Supplies, Inc., in the East Ballroom of the Hotel Commodore on the evening of Tuesday, February 20, during Paper Convention Week in New York. The event marked the fortieth anniversary of the Association, it having been founded in 1900.

Close to 300 leading dealers in papermaking materials and their mill men guests sat down to a sumptuous seven-course dinner, and afterward enjoyed an entertaining stage show by talented performers recruited from vaudeville, radio and night clubs. Each act was received with vociferous applause, and the show kept up until nearly midnight.

Before the serving of the dessert course, lights were dimmed and waiters marched in carrying above their heads a huge birthday cake appropriately decorated with 40 lighted candles, a gift from the hotel's banquet director. Later the enormous cake was donated to St. Vincent's Hospital by Julius Levine, association president.

Walter H. Martens, of George W. Millar & Company, Inc., the perennial chairman of the Association's Banquet Committee, again had charge of the annual affair, assisted by John L. Nielsen, of the E. J. Keller Company, Inc., and Arthur Rosenfeld, of William Steck & Company, Inc.

A handsome 68-page journal containing the program and menu and advertisements of a large number of firms in the trade was distributed as a souvenir of the occasion. Alfred J. Moran, secretary of the Association, was chairman of the Journal Committee.

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N. Y. COLLEGE OF FORESTRY ALUMNI HOLDS REUNION

Alumni of virtually every class from 1916 to 1939 attended the New York State College of Forestry pulp and paper alumni dinner on February 21 in New York City. Charles G. Weber, of the Bureau of Standards, Washington, D. C., was toastmaster of the affair.

As usual, the meeting was entirely informal. The faculty of the college was represented by Dean S. N. Spring and by Professors C. E. Libby, W. O. Hisey, E. C. Jahn and F. W. O'Neil. Dean Spring and Professor Libby gave short talks describing the activities of the college and plans for the future.

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Fig. 1640 'KING-CLIP'

"THE KING OF CLIP VALVES"

Fig. 1640 is the original clip valve with drain channels and bronze thread bushing in bonnet.

The exterior construction clearly indicates the large drain channels; of ample size to thoroughly drain the bonnet of even fluids which tend to clog.

The bronze thread bushing cast in the bonnet has excellent wearing qualities and provides non-corrodible contact for stem.

Fig. 1640 "King-Clip" also has other important features:-

Bronze stem – perfectly aligned, with repacking seat above threads.

Extra strong stuffing box with hexagon head gland.

Bronze disc and rolled-in bronze seat rings – bronze to bronze contacts throughout which prevent corrosion.

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Salesmen's Association

Is Twenty-one Years of Age

▸▸▸ CELEBRATING THE TWENTY-FIRST ANNIVERSARY of its founding, the Salesmen's Association of the Paper Industry held a most successful twenty-first annual meeting and luncheon in the Waldorf-Astoria Hotel, New York, on Tuesday, February 20.

The annual meeting was held in the Carpenter Salon, commencing at 10 a. m. With President Hugh N. Phillips, of the International Paper Company, New York, presiding, reports of the officers and committee chairmen were rendered for the year, revealing that the Association is in a very healthy condition after a year of numerous and varied activities.

The election of officers resulted in the selection of the following to serve the association for the ensuing year:

John R. Diggs, of the Mosinee Paper Mills Company, Chicago, president.

John D. Johnston, Gaylord Container Corporation, New York, eastern vice president.

Courtney H. Reeves, Allied Paper Mills, Chicago, western vice president.

H. A. Stone, Jr., Riegel Paper Corporation, New York, assistant eastern vice president.

Burt B. Fisher, Bergstrom Paper Company, Neenah, Wis., assistant western vice president.

Dr. E. O. Merchant, New York, secretary.

In his annual address, President Phillips said, in part:

"Each year our retiring president submits a report at this meeting. These reports contain a resume with comments on the year's events, coupled with observations and suggestions for the year to come. This report, together with the committee reports and the election, form the basic reason for this meeting. But to me the main interest in this meeting is the getting together of our eastern and western groups. Each has its 'esprit de corps' and special group friendships. Each group does and must have certain differing characteristics. It is grand, however, that an organization should be so friendly and close-knit that it is a pleasure to emphasize differences just as we emphasize personalities. I know that we in the East cherish and admire our western friends for characteristics we do not possess and trust and believe they feel likewise toward us. This is real unity.

"Our numbers this last year have changed but little. We have lost 34 by death or failure to pay their dues and taken in 36 new members, showing a slight net gain. While there is no reason for setting a top limit to our membership, I believe I have noticed a gradual healthy change in our attitude

John R. Diggs is the new president of the Salesmen's Association

toward growth. With a membership list holding close to the 300 mark our approach to prospective members is rather more of an invitation than an appeal. It is particularly gratifying to have members of previous years resume membership with the comment that they have missed our gatherings and our weekly bulletins.

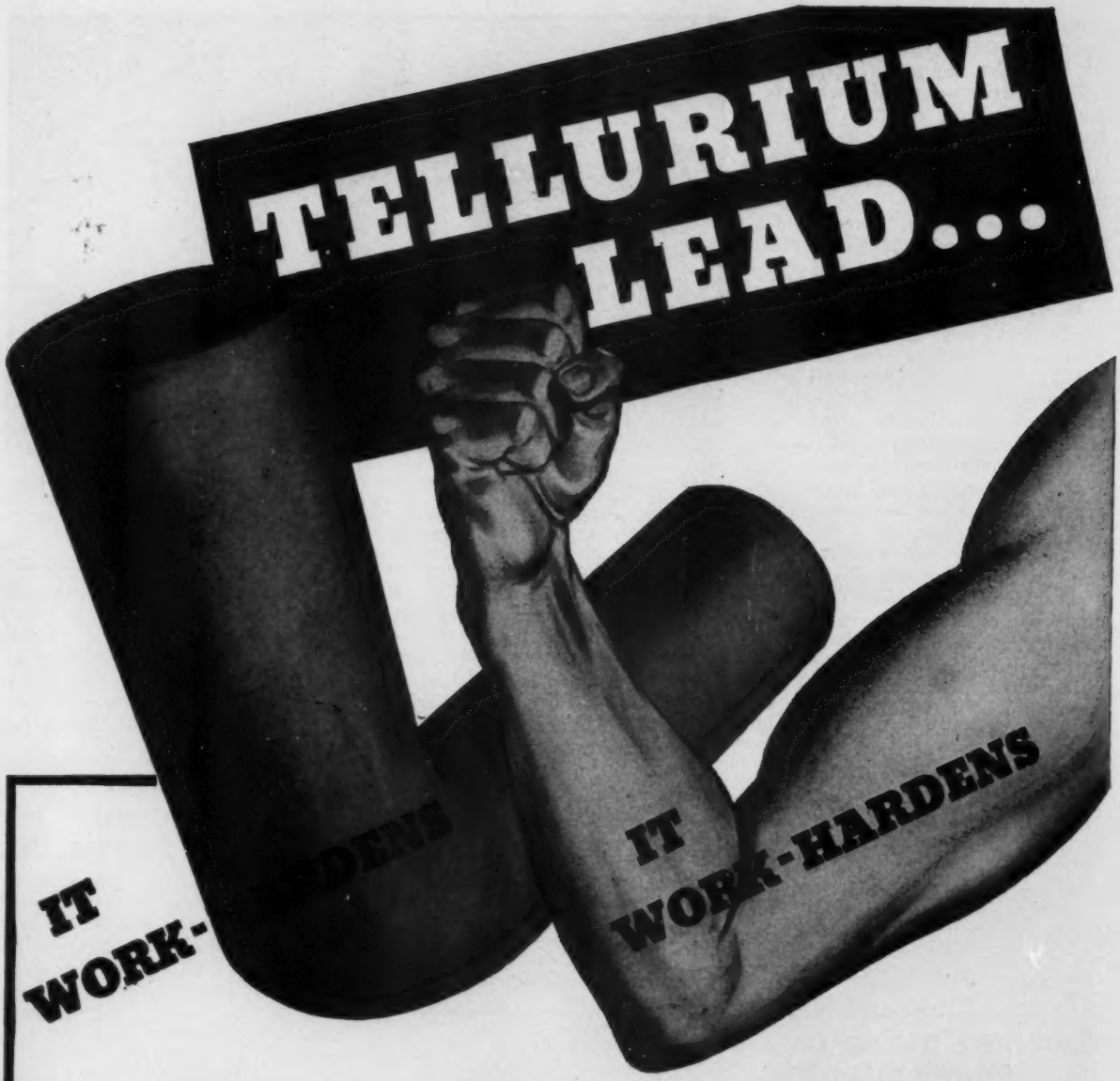
"Our finances are in a healthy state. We pay our way without obligation or subsidizing. Our budget is an accurate prediction of our year's expenditures.

"Each year we report with special emphasis on the year's outstanding effort of the Association. We have a heritage of many accomplishments in the past—Import Committee, social affairs including growth of our annual luncheon, trade customs work and the like. This year, I believe, our outstanding contribution has been the development of our placement service. Each year one man gives particular emphasis to such a project. I wish to make particular recognition of Norman Beardsley for his sympathetic, loyal work on this placement service plan.

"This last June your president was invited by Mr. F. L. Zellers, president of the Superintendents' Association, to participate in their annual convention in Washington. Our first president, George K. Gibson, also had a place on their program. This friendly overture on the part of an affiliated organization has not been forgotten. Today the president of the Superintendents' Association will have a place of honor at our luncheon. One of the best things we can do as salesmen is to bring our own production men to a closer understanding of the fact that the prices at which their own products are sold are influenced in the same way as stocks or commodities, and not just established at the whim of the salesman, and that all paper prices vary in some degree with general conditions in the industry. By exchanging ideas with these men we will improve one of the most important links in our business.

"This last year has seen a satisfactory degree of prosperity to the paper business in general. This, in my humble opinion, has been not so much due to our own wisdom as to the war, which we all deplore. While it continues, we will see increased values in our own raw materials. If this becomes general it will be called inflation, which is a delusion of wealth and which always has a 'morning after.' Should such a thing come to pass I can only pray that our industry utilizes the period of change to revise its pricing policies. During a period of advancing costs we practically 'flag' the increases, so in effect we say to our customers, 'I'm going to increase my prices just as soon as you've bought all you can store at present prices,' and by the time we put our increased prices into effect, the demand has naturally ceased and we don't really sell much at the higher prices. We could well afford to study pricing policies of other industries, notably copper."

Eastern Vice President Johnston, reporting for the Eastern Division, told of the work done to further the employment placement service, and reviewed the various activities in the East during the year, including the weekly luncheons, golf meets and evening get-togethers.



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Hard knocks—far from weakening this lead — merely develop its latent strength. Therefore:

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2. *Where vibration is excessive, buckling and creeping are cut down to a minimum.*
3. *Where heat changes are frequent and rapid, there is less danger of fracture.*

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Mr. Diggs, western vice president, reported on the activities of the western group for the year. George K. Gibson, first president of the Salesmen's Association, reported for the Membership Committee, and gave hearty approval to the proposed drive for new members recommended by the Executive Committee.

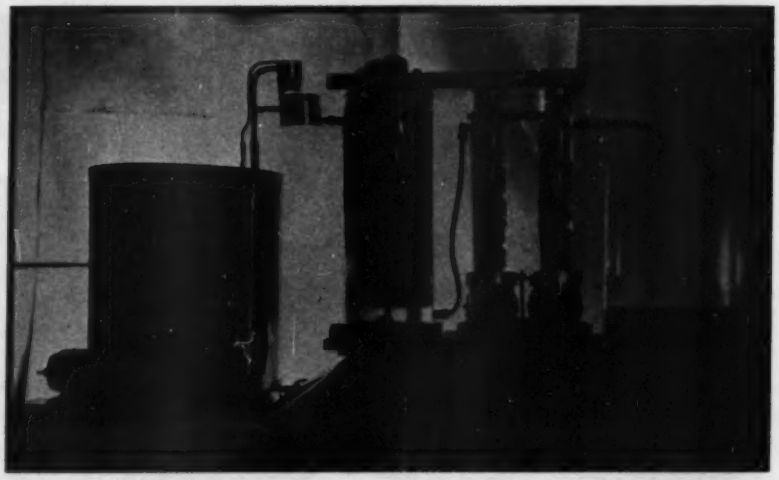
Mr. Gibson called on George Davidson, a charter member of the Association from Canada, who spoke on conditions prevailing in the Dominion.

Mr. Gibson pointed to the fact that during the 21 years of the Salesmen's Association there have been some 17 or 18 presidents of the group, and that, as fortune will have it, every one of these is now alive and active. He made the suggestion that at the annual luncheon of the association next year all these former chief executives of the association be invited as honor guests.

Warren B. Bullock, one of the early secretaries of the Salesmen's Association and now manager of the Import Committee of the American Paper Industry, was called on for remarks, and reminisced briefly on the early days of the association.

The annual luncheon of the Salesmen's Association, which immediately followed the annual meeting, in the grand ballroom of the Waldorf-Astoria, was without question the social highlight of the American Paper and Pulp Association's convention in New York. The immense ballroom was filled, as well as the entire first balcony. Former United States President Herbert Hoover made a surprise appearance at the luncheon to thank the paper industry for the support it has given to the campaign for funds to aid war-stricken Finland. Following the ex-president's departure, association President Phillips called attention to envelopes at the tables placed there for contributions. Later the envelopes were collected and it was announced that a sum of $1,478 had been contributed by the luncheonites to the Finnish fund. The Association donated $100.

Principal speaker at the luncheon was Dr. Frank Kingdon, president of the Newark (N. J.) University, now on leave of absence, who spoke on the part business must play in the America of the future. Retiring President D. C. Everest of the A. P. P. A. spoke, as did also the new A. P. P. A. executive secretary, E. W. Tinker.



Model of Delthirna Sizing System exhibited during Paper Week at Waldorf-Astoria Hotel, New York City. Use of glass for main tube, U-tubes, and finished size storage tank permits observation of reaction between rosin and caustic in the production of size and shows the finished size in storage.

ENGLAND RULES ON PAPER IMPORTS

The British Ministry of Supply's order Number Five has prohibited, except under license, the importation of the following goods:

Paper and board made from paper or pulp whether coated or otherwise treated in any manner or not and whether consisting of more than one layer or not other than strawboard (not including corrugated board), line or unlined, which is already subject to license under import prohibition order Number One.

Articles made wholly or mainly from paper or from board made from paper or pulp including composite paper and composite paper boards; corrugated paper and board boxes, bags, cartons, cases and other similar containers are also prohibited except under license.

Applications for license which must be made initially to the Paper Controller, Ministry of Supply, will be considered on their merits having regard to the ultimate use for which the products are intended.

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CAN. NEWSPRINT CAPACITY MAY BE INCREASED

Canadian commercial mills, such as the Donnacona Paper Company, appear justified in expecting average newsprint operations around 70 per cent of capacity in 1940 as against less than sixty per cent in 1939. In the case of the Donnacona company, this would mean about 60,000 tons and possibly 100,000 more tons than last year.

In a very short while, when the acid accumulator now being installed in the sulphite mill is ready for operation, Donnacona will have about 1,000 tons additional monthly of unbleached sulphite capacity. Added to the present surplus this will mean a total of 23,000 per annum of unbleached sulphite available for sale. Since the latter part of 1939, the Donnacona company has been finding a profitable market in the U. S. for surplus groundwood pulp.

◆

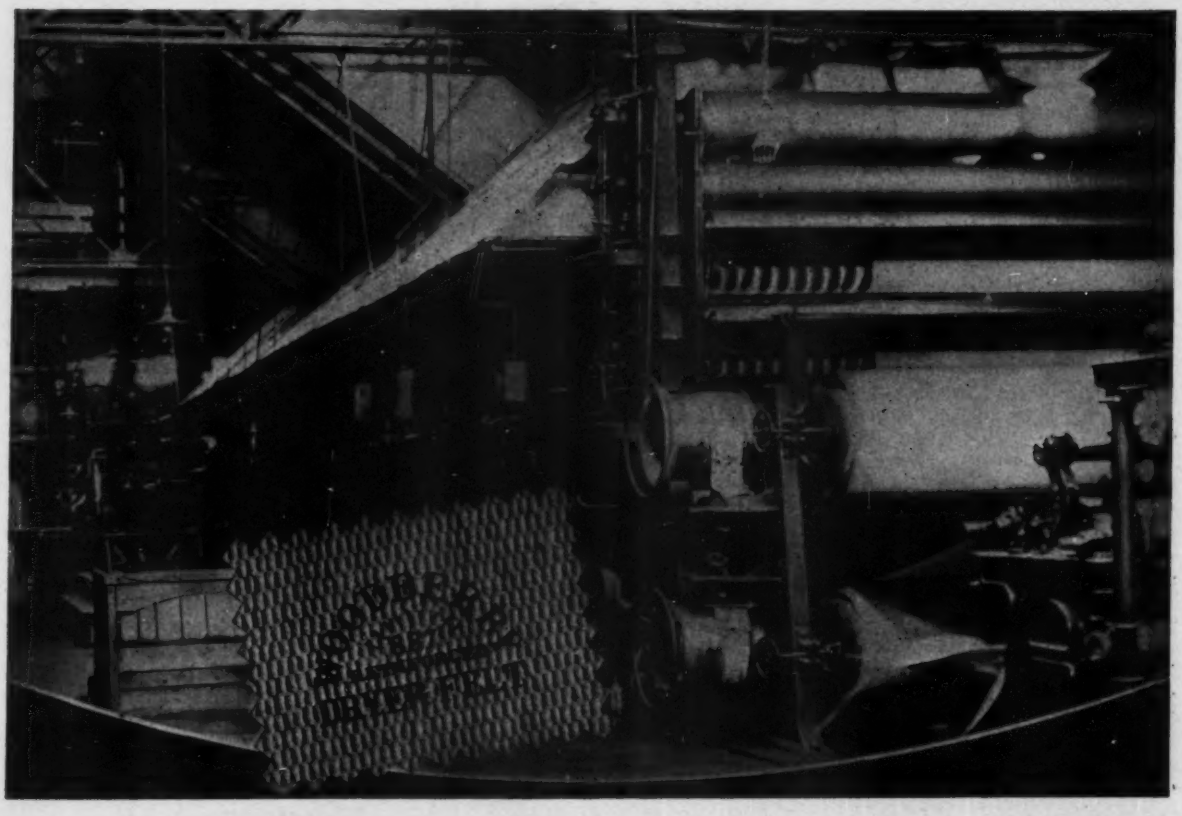
HUMMEL-ROSS HAS LICENSED INT'L PAPER CO.

The Hummel-Ross Fibre Corporation has licensed the International Paper Company and the Southern Kraft Corporation to use the secondary head box in their manufactures under the United States letters patents 2,098,733 and 20,667 (Re.) and the Canadian letters patents 364,597; 374,724; and 380,169.

In this transaction the Southern Kraft Corporation assigned to Hummel-Ross Fibre Corporation exclusive licenses under the Charlton, Nicholson and Tuten patents and the applications therefor, with the right in the Hummel-Ross Fibre Corporation to grant sub-licenses thereunder to the licensees of Hummel-Ross Fibre Corporation under its sale patents resulting to the manufacture of multiple-ply paper and board involving the use of secondary head boxes. The amount of royalty to be paid by the International Paper Company was not disclosed.

Among the other licensees on the North American continent are the Union Bag and Paper Corporation, Savannah, Georgia; the Filer Fibre Company, Filer City, Michigan; the Albermarle - Chesapeake Corporation, West Point, Virginia, and the Ocean Falls mill of the Zellerbach Corp.

Savings up to 40 Per Cent in Dryer Felt Costs Effected WITH WOODBERRY Reinforced 887



Month after month case histories on WOODBERRY Reinforced 887 dryer felts are accumulating in greater numbers. Savings up to 40 per cent in dryer felt costs per ton of paper are being reported. Shrinkage and stretch have been reduced to a minimum. Fewer machine stops, less adjustment and lower steam consumption are among the advantages claimed for them. Specify WOODBERRY Reinforced 887 dryer felts for maximum efficiency and lower dryer felt costs.

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Sixteen Groups Hold
Divisional Meetings

Writing Paper Manufacturers Association

The seventy-ninth annual meeting of the Writing Paper Manufacturers Association was held on February 20 in the Jansen Suite of the Waldorf-Astoria Hotel with a large attendance of the membership present. President A. C. Gilbert, of the Gilbert Paper Company, presided. Dr. Virgil Jordan, president of the National Industrial Conference Board, discussed the general business outlook for 1940.

Mr. Gilbert, who is president of the Gilbert Paper Company, Menasha, Wis., was re-elected president of the Association for the ensuing year. Morris C. Dobrow was again elected executive secretary and treasurer. In his report to the Association members, President Gilbert said:

"The decade which has just ended has been characterized largely by the difficulties of economic depression. To this must be added political developments which have from time to time brought uncertainty, resulting in increased changes and wide fluctuations in the whole economic picture. Industry is no longer solely a matter of production and sale of goods. Our Association has been most helpful in dealing with these varied political and economic problems which management is required to take into account at every point. Through our Association we have made great progress in the development of intelligent, detailed statistics, and sound, economic information for guidance in the conduct of our individual mills."

The following were elected as the Executive Committee of the Association:

A. C. Gilbert, Gilbert Paper Company, chairman; H. R. Baldwin, Hammermill Paper Company; M. D. Bardeen, Lee Paper Company; G. H. Beckett, The Beckett Paper Company; D. D. Coffin, C. H. Dexter & Sons, Inc.; Bruce Crane, Crane & Co., Inc.; G. B. Fowler, Valley Paper Company; W. J. Garrity, Munising Paper Company; T. A. Hendry, The Mead Corporation; G. P. Lee, The Parker-Young Company; R. S. Madden, American Writing Paper Corporation; E. A. Oberweiser, Fox River Paper Corporation; F. H. Savage, International Paper Company; W. B. Zimmerman, The Maxwell Paper Company, and J. D. Zink, Strathmore Paper Company.

John D. Zink, of the Strathmore Paper Company, West Springfield, Mass., was elected head of the Rag Content Group of the Writing Paper Manufacturers Association.

Association of Newsprint Manufacturers

All officers were re-elected by the Association of Newsprint Manufacturers of the United States at the annual meeting of that group on February 21. A. L. Hobson, of the St. Croix Paper Company, was renamed chairman for 1940, and Samuel Pruyn, of Finch, Pruyn & Co., and J. D. Zellerbach, of the Crown-Zellerbach Corporation, were re-elected vice chairmen. Advisory Committee members elected were George D. Bearce, Maine Seaboard Paper Company; Gordon H. P. Gould, Gould Paper Company; R. H. M. Robinson, Minnesota & Ontario Paper Company, and John H. Smith, Hawley Pulp & Paper Company. Royal S. Kellogg continues as secretary-treasurer.

Glassine and Greaseproof

Members of the Glassine and Greaseproof Manufacturing Association held sessions on both Tuesday and Wednesday during Convention Week in New York and concluded with the election of Folke Becker, president of the Rhinelander Paper Company, Rhinelander, Wis., as chairman for the ensuing year. The Executive Committee elected is comprised of Olaf Hedstrom, Hartford City Paper Company; Paul E. Hodgdon, Deerfield Glassine Company; Harry B. Kuhns, Nicolet Paper Company; Paul F. Moore, Westfield River Paper Company; Robert F. Nelson, Glassine Paper Company, and John L. Riegel, Riegel Paper Corporation. Social features of the Association's annual meeting were a dinner for the Executive Committee in the Waldorf-Astoria Tuesday evening, and a luncheon for the entire group on Wednesday.

The Tissue Association

J. M. Conway, of the Hoberg Paper Mills, Green Bay, Wis., was elected president of The Tissue Association at the annual meeting of that organization in the Waldorf-Astoria Hotel on February 20. Dwight G. W. Hollister, of the A. P. W. Paper Company, was elected vice president; S. Wishnick, of the Park Tissue Mills, treasurer, and Ross A. Fife, assistant treasurer and executive secretary.

Members of the Board of Governors elected were B. F. Picola, Gotham Tissue Corporation; Howard Larsen, Crystal Tisse Company; J. L. Ober, Scott Paper Company; Sam Lopin, Mazer Paper Mills; W. F. McIntyre, McIntyre Bros. Paper Company, and E. W. Kiefer, Port Huron Sulphite and Paper Company.

B. I. Reider, of the Victoria Paper Mills, was named chairman of the Roll Toilet Tissue Division; R. B. Stevens, of the Stevens and Thompson Paper Company, chairman of the Interfolded Toilet Tissue Division; William Servette, of the Bay West Paper Company, chairman of the Paper Towel Division; William Shafer, Jr., of the Flower City Tissue Mills, chairman of the Wrapping Tissue Division; Floyd Graham, of the Graham Manufacturing Company, chairman of the Paper Napkin Division, and R. W. Sweet, of the Sweet Bros. Paper Company, chairman of the Jumbo Roll Division.

The Association voted an increased budget for the fiscal year of 1940, and passed a resolution to institute, through the efforts of Executive Secretary Fife, an educational campaign for further support of the American Paper and Pulp Association. Retiring Executive Secretary Charles W. Boyce of the A. P. P. A. spoke briefly and introduced his successor, E. W. Tinker.

Blotting Paper Manufacturers

Henry S. Mead, of the Wrenn Paper Company, was re-elected president of the Blotting Paper Manufacturers Association at the annual meeting of that group in the Waldorf-Astoria Hotel on February 20. Ulysses Bratton, of the Rochester Paper Company, was elected vice president, and James L. Ritchie, of New York, secretary and treasurer.

Groundwood Paper Manufacturers

E. G. Murray, of the St. Regis Paper Company, was elected president of the Groundwood Paper Manufacturers Association at the annual meeting on February 19 in the Carpenter Salon of the Waldorf-Astoria Hotel. Mr. Murray succeeds J. H. Coy, of the

ROLLS

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• THROUGH the installation of improved facilities and equipment, and the establishment of an highly efficient production schedule, the Bagley and Sewall Company has made it possible to produce and sell rolls at prices on a par with competitive rolls of inferior quality. Every roll, regardless of size or material, is perfectly finished, rigidly inspected and tested for running balance on our Dynamic Balancing Machine before its shipment.

May we quote you on any of your roll requirments?

THE BAGLEY AND SEWALL CO.

Builders of Fine Machinery

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Flambeau Paper Company. Walter Shorter, of the International Paper Company, was elected vice president, and the foregoing two officers together with C. K. Andrews, of the Blandin Paper Company; Aubrey Crabtree, of Fraser Industries, Inc., and W. A. Munro, of the Flambeau Paper Company, compose the Board of Governors for the ensuing year.

Committees named were as follows: Standards — Paul Mahony, International Paper Company, chairman; John J. Gieseke, St. Regis Paper Company, and F. D. Patterson, Flambeau Paper Company. Statistics — George Fay, Escanaba Paper Company, chairman; C. W. Miller, Kimberly-Clark Corporation, and Leonard Kuehl, Flambeau Paper Company. Manufacturing—W. D. Maxim, International Paper Company, chairman; Aubrey Crabtree, Fraser Industries, Inc., and E. G. Bennett, Escanaba Paper Company.

Speakers at the meeting included Warren B. Bullock, manager of the Import Committee for the American Paper Industry; E. W. Tinker, incoming executive secretary of the A. P. P. A., and Charles W. Boyce, outgoing A. P. P. A. secretary.

Cardboard Manufacturers Association

Malcolm B. Lowe, of the Lowe Paper Company, Ridgefield, N. J., was elevated to the presidency of the Cardboard Manufacturers Association at the annual meeting of that organization in the Waldorf-Astoria on February 21, after having served as vice president, and succeeding John Van Horn, of the Holyoke Card and Paper Company. Fred C. Heinritz, of the Appleton Coated Paper Company, was elected vice president, succeeding Mr. Lowe, and James L. Ritchie, of New York, was re-elected secretary and treasurer.

Bristol Board Manufacturers Group

The Bristol Board Manufacturers Group held its annual meeting, following a luncheon, in Le Perroquet Y of the Waldorf-Astoria on the opening day of the A. P. P. A. convention in New York, February 19. James B. Ramage, of the Franklin Paper Company, Holyoke, Mass., was re-elected chairman, and Joseph E. Holmes, of the Chemical Paper Maufacturing Company, Holyoke, was again elected vice chairman.

The Executive Committee elected comprises the chairman, the vice chairman and R. I. Worrell, Wheelwright Papers, Inc., New York City; James F. Ryland, Standard Paper Manufacturing Company, Richmond, Va.; Norman Harrower, Linton Bros. & Co., Fitchburg, Mass.; Kendall Wyman, Champion Paper & Fibre Company, Hamilton, O.; Edward Bailey, Hollingsworth & Whitney Company, New York City; B. C. Hopper, Hopper Paper Company, Taylorville, Ill., and Carlton W. Smith, Miamisburg Paper Company, Miamisburg, O.

R. G. Westad retired as a member of the Executive Committee.

Paper Makers Advertising Association

At the annual meeting and luncheon of the Paper Makers Advertising Association held at the Hotel Lexington in New York on February 19 in connection with the American Paper and Pulp Association convention, Floyd Triggs, of the Riegel Paper Corporation, was re-elected president. Other officers re-elected were Edson Dunbar, Crocker-McElwain Company and Chemical Paper Manufacturing Company, Holyoke, Mass., eastern vice president; E. S. Colvin, Appleton Coated Paper Company, Appleton, Wis., western vice president; Maurice Park, the Marvellum Company, Holyoke, treasurer, and Richard A. Faulkner, International Paper Company, New York, secretary.

The guest speaker at the luncheon meeting was Ernest F. Trotter, managing editor of Printing Magazine, whose topic was "Printing Trends as They Affect Paper Mill Advertising."

United States Pulp Producers

At the annual meeting of the United States Pulp Producers Association the following regional directors were elected: New England—Amor Hollingsworth, Penobscot Chemical Fibre Company; Middle Atlantic—Norman W. Wilson, Hammermill Paper Company; South—Clyde B. Morgan, Rayonier, Inc.; Lake States—Stanton W. Mead, Consolidated Water Power & Paper Company; West Coast—Robert B. Wolf, Pulp Division of the Weyerhaeuser Timber Company; Directors at Large—Ossian Anderson, Puget Sound Pulp and Timber Company; Downing P. Brown, Brown Company; J. M. Conway, Hoberg Paper Mills; Stuart B. Copeland, Northwest Paper Company; U. M. Dickey, Soundview Pulp Company, and A. H. Showalter, Mount Tom Sulphite Pulp Company. Oliver M. Porter, of New York City, continues as executive director.

The meeting was addressed by F. G. Robinson, recently elected president of the Canadian Pulp and Paper Association, and D. C. Everest, president of the American Paper and Pulp Association.

Glazed and Fancy Paper Manufacturers

The Glazed and Fancy Paper Manufacturers Association held its annual meeting and luncheon in the Commodore Hotel, New York, on Monday, February 19. With President Harry B. Conklin, of Louis Dejonge & Co., New York, presiding, the meeting adopted amendments to the articles of the Association permitting membership in the organization to all merchants handling papers made by the manufacturing members of the group. The executive director, it is provided, shall act as secretary-treasurer of the Association and as secretary of both divisions. The change was recommended by the Executive Committee.

Mr. Conklin was re-elected president for the ensuing year, and Leo R. McDevitt, of the Blackstone Glazed Paper Company, was re-elected vice president. A new vice president elected is George Buell, of Charles W. Williams & Co., New York City. Arthur A. Thomas was again named executive director. The new Executive Committee elected is composed of John N. Hazen, Hazen Paper Company, and Charles Matthais, Matthais Paper Company, for two years, and Francis C. Heywood, the Marvellum Company and A. C. Anders, Bradner Smith Paper Company, for one year.

Coincident with the membership change, the meeting was reported the largest attended and most enthusiastic in the history of the organization. Executive Director Thomas stated that 32 firms were represented. The principal speaker was Royal B. Farnum, director of the Rhode Island School of Design, who spoke on styling of box papers for merchandising. Mr. Farnum traced the development of design over the years and brought his subject up to the present time with recommendations for the future.

Sulphite Paper Manufacturers Association

One of the first group annual meetings of the convention in New York was that of the Sulphite Paper Manufacturers Association, held in the Jansen Suite of the Waldorf-Astoria Hotel on February 19, following a luncheon. In the absence of John E. Alexander, president and general manager of the Nekoosa-Edwards Paper Company and general chairman of the Association, who was unable to attend, George Stuhr, of the Southern Kraft Corporation, vice chairman of the Unbleached Group, presided.

Leroy F. Porter, of the Northwest Paper Company, was elected general chairman for the ensuing year; Mr. Stuhr was re-elected vice chairman of

THE MYSTERY* of the GNAWING FUMES

SOLVED WITH PREVENTIVE MAINTENANCE

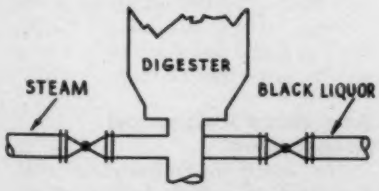
"That's three days lost with cooker trouble this month!" cried the V. P. in Charge of Production.

"And you'd think those valve seats were blasted with sand," replied the SUPERINTENDENT.

"Seems to me," said the CRANE MAN, "Preventive Maintenance is needed here. And Crane makes the valves it prescribes."

THAT'S just a guess at what might have been said one morning in a well-known sulphate mill. They were having trouble with the valves in the steam lines to digesters. The management was bearing down hard to keep up with orders; and the crippled digesters didn't help production schedules any. It was an alarming situation.

Look at the diagram below. When the steam was shut off, pressure from within the vessels forced black liquor fumes into the steam line where they attacked the valves. The seating surfaces were eaten away.



Ordinary maintenance was an utter failure. The valves broke down almost as fast as replacements were made.

The Superintendent was frantic. And he saw that Preventive Maintenance —as recommended by J. L. T., the Crane Salesman—was the only answer. It would stop trouble at the source. It counseled replacement not with valves whose seats and discs could crumble in the burning black liquor fumes, but with Crane valves trimmed with corrosion resistant material proved for the service need.

Results: (1) No more trouble since the new valves were installed; the steam is under perfect control. (2) Another user of piping has learned the economy of Preventive Maintenance, and, that Crane builds the right valves and fittings for every piping requirement. (3) Another manufacturer knows the wisdom of calling in the Crane Representative on every kind of flow control problem—big or little.

**This case is based on an actual experience of a Crane Representative in our Cincinnati Branch.*

TO HELP YOU COMBAT CORROSION —*Crane Alloy Valves*

If you have a problem of corrosion in piping, bring it to Crane. With a vast experience in the handling of corrosive fluids, with a knowledge far beyond the simple relation of metals and chemicals, Crane is well equipped to help you deal with this menace to pulp and paper processing.

In the regular Crane Alloy Line, you have a complete selection of valves and fittings of such materials as Nickel, Monel Metal, 18-8 Mo., Everdur, Ni-Resist, All-Iron, and many others with high resistance to chemical action.

For Preventive Maintenance on black sulphate liquor lines, Crane valves with nickel-chrome iron body, 18-8 Mo. trim in disc, seat and stem, will give dependable flow control at minimum cost. Talk it over with your Crane Representative today.

1940 and 85th YEAR

CRANE

CRANE CO., GENERAL OFFICES: 836 S. MICHIGAN AVE., CHICAGO

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS

the Unbleached Group; Fred W. Cole, of Fraser Industries, Inc., vice chairman of the Bleached Group; Rufus L. Sisson, Jr., of the Racquette River Paper Company, vice chairman of the Manila Group, and Edgar W. Kiefer, of the Port Huron Sulphite & Paper Company, vice chairman of the Machine Glazed Group.

The Board of Governors elected consists of John E. Alexander, Nekoosa-Edwards Paper Company; Martin A. Brown, Parker-Young Company; Walter B. Merlin, Hollingsworth & Whitney Company; Harold O. Nichols, Crown-Zellerbach Corporation; John Stevens, Jr., Marathon Paper Mills, and Rufus I. Worrell, Mead Corporation.

President D. C. Everest of the American Paper and Pulp Association addressed the meeting. Mr. Everest spoke in part as follows:

"Your annual meeting, coming as it does on the first day of Paper Week, seems a fitting place to sound the keynote of the Paper Industry's convention, as I view it.

"Incidentally, speaking of notes, this is my 'swan song' as president of the American Paper and Pulp Association and I sincerely hope you will give my succesor the same loyal support you have extended to me.

"You are all familiar with the happenings of the past year. There is no need to review them except to emphasize the fact that the total production and consumption of all grades of paper and paperboard has exceeded any previous year.

"During the last three months of 1939 the rate of production and the volume of business placed has far outrun anything previously recorded. Because this high rate has not been maintained recently, some people have become jittery. We must realize, however, in this connection, that a relatively small proportion of shipments made during the last few months has actually gone into 'war work'. We were already on a definite upward trend in this country when war broke out in Europe.

"Inventories were relatively low and many distributors and converters placed business in excess of immediate requirements. This, in addition to a naturally increasing demand, built up a backlog of tonnage which carried many mills over until the end of the year at a high rate of operation. Normally we might have expected a seasonal slump in production during December, but the paper industry, as a whole, during that month, ran at the rate of 91.2 per cent as against 74.4 per cent in 1938 and only 54.5 per cent in 1937. Your Divisional Association figures, were however, somewhat above the average.

"One thing is to our credit, namely that during the last six months the paper industry has handled its pricing policy in a sensible manner. Some advances were made to bring prices up to a decent level and to cover advancing costs but that was all. Everyone advised their customers not to buy beyond their actual requirements. It was about as safe and sane an exhibition as we have ever seen under similar circumstances because raw materials, as you know, have increased materially so that I doubt very much if the prices of finished paper have kept pace with them.

"We will never again have the same set-up in relation to imports that we had prior to the war, at least not within my time, maybe yours. Any war situation as complicated as this, is bound to result in new ownerships and new methods of distribution. After this war is over, every country in Europe will be anxious to sell many things required in this country. Pulp will certainly be one of them and unless the pulp mills of the Scandinavian countries are completely destroyed, it will not be long before they are again in this market and at mighty low prices. Domestic manufacturers, therefore, will do well to do everything possible to cement customer relationships during the period of the war.

"Naturally price is important, not only with respect to consumption but also, and perhaps more positively, with respect to production; given an abnormal price situation of any duration, and Capital, always restless, will begin to flow into new construction.

"We all know, only too well, we have all the productive capacity necessary to take care of all paper and board requirements in this country for some time ahead. Pulp and other raw materials are bound to cause us some difficulty, but when it comes to additional machine capacity it is much more sensible to put up with a temporary shortage than to be loaded to the guards with productive capacity for which it will be absolutely impossible to find a market after the war is over.

"This industry must have a well maintained operating rate for presently established mills, if we are to continue to enjoy any prosperity. It is time to settle down and not bring in new capacity on every bulge of demand above normal requirements. Our past experience has indicated that when expansion waves begin they always outrun actual requirements with the result that until consumption catches up with capacity mills operate at unprofitable levels.

"I trust that through this war period manufacturers will exercise a better degree of self-control than in the past. We do not want a repetition of the 1918 to 1920 period. Getting off a pinnacle of high prices is a dangerous business and someone always gets hurt.

"To sum up the situation: Let us keep our heads and do our pricing on a sane basis. Let us avoid speculation and urge our customers to buy only for current requirements. Generally speaking, we must keep our parachute in repair and be ready to use it in the event that we have to 'bail out' during the coming year.

"Before closing, I want to ask for your continued support of the splendid work being done by the Sulphite Paper Manufacturers Association, also by the parent association, the American Paper and Pulp Association, which you also support. There has never been greater need for your support than at present. We all know that it will be mighty hard going during the coming months unless we are fully advised as to the facts relating to our business and there is no association in the industry that is better so informed than your own.

"Not only is the European situation difficult but with Congress in session it is most important that your parent association receive your hearty cooperation and support.

"May I add finally that I trust we may all exert every effort to keep this industry on a safe and sane basis, thus softening the after effects of the conflicts abroad."

Waxed Paper Association

The American Waxed Paper Association at its annual meeting in the Waldorf-Astoria Hotel on February 20 elected five members to its Board of Governors, as follows: Leslie Jacobs, Pollack Paper & Box Company, Dallas, Tex.; Marshall Smith, Menasha Paper Products Company, Menasha, Wis.; A. Southon, Kalamazoo Vegetable Parchment Company, Parchment, Mich.; Robert Donnelly, Central Wax Paper Company, Chicago, and Larry O. Turner, Detroit Wax Paper Company, Detroit, Mich. George J. Lincoln, Jr., was re-elected executive secretary.

Soda Pulp Manufacturers

A general discussion of business conditions was engaged in at the annual meeting of the Soda Pulp Manufacturers Association on February 20 in the Waldorf-Astoria, and the following were elected as vice chairmen: Amor Hollingsworth, Penobscot Chemical Fibre Company; Stuart B. Copeland, Northwest Paper Company; W. D. Duryea, Penobscot Chemical Fibre Company; Clarence Clough, New York & Pennsylvania Company Robert J. Burke, Mead Sales Company; G. F. Robinson, International Paper Company, and E. J. Thom, E. J. Thom Company.

Specialty Paper and Board

The Specialty Paper and Board Affiliates held several sessions on February 20 and 21 during the convention in New York, including the general meeting of the organization and meetings of the Mill Blanks Group, the Tag Board and File Folder Group and the Lined Board Group.

American Pulpwood Association

The American Pulpwood Association held its annual meeting on the final day of the convention, or Friday, February 23, in the Waldorf-Astoria. Major R. H. Spessard, of the N. E. Spessard Company, was re-elected president for the ensuing year; C. O. Brown, of the Southern Kraft Corporation, first vice president, and Chester W. Alden, of the Oxford Paper Company, second vice president. H. E. Brinckerhoff continues as executive secretary.

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YOUR ORDER OR INQUIRY WILL BE HANDLED PROMPTLY BY THE NEAREST OFFICE

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Milwaukee, Wis.
Chicago, Ill.
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Erith, England
The Hague, Holland

PM-70

Convention Papers . . . Abridged

Industry and Leadership

R. A. HAYWARD, President
Kalamazoo Vegetable Parchment Company

Today managers of industry are as much concerned with the present and future stability of our social and economic structure as they are with the immediate technical development of the manufacturing processes.

With our country stunned by the depression and with all security apparently washed away, the people were willing to follow any leader or party that would re-establish their hope in the future.

We have made a substantial recovery from that low point, and with it we have enacted many reforms and regulations.

At the present time, we are facing the question of whether we should enact additional regulations and reforms and further regiment industry, or whether we should try to assimilate the reforms that have already been made and adjust them so that they will fit into our democratic system of government. It is this uncertainty that is preventing a co-operative solution to our present problems.

A large number of the papers presented at the annual meeting of the Technical Association held in New York City, February 19-22, 1940, have been digested, and the first installment appears in this issue. The presentation of these abridgments will be continued in the April issue.

The final answers to these questions will be decided by the majority of the voting people of the country. Their decision will depend to a large extent on how well they understand the issues that are involved.

To sum up the reforms already enacted makes quite an impressive record. They cannot, however, be counted as progress until we have demonstrated that the country can operate on a balanced budget with these reforms in effect. They cannot be credited as accomplishments until the bills are paid.

What does an unbalanced budget mean to the average working man? It means very little because he has little understanding of the issues involved. Every one, however, has a feeling that something is wrong. They all know you cannot go on indefinitely spending more than you are taking in. And there is a desire on the part of the people to know something about the problem.

When we talk to the average person about this matter of balancing the budget, he immediately replies that the budget could be balanced now by increasing the taxes on industry, and would be done if the industrial leaders would not kick so much about the high cost of taxes.

There is definitely a general belief that industry could stand the additional load and no one would be seriously affected.

Are the leaders of industry not making a serious mistake in allowing this confusion to exist? Should not the people be told the plain truth—that *Industry Does Not Pay Taxes?* An industrial organization only collects taxes from either the consumer, the laborer, or the stockholder, and turns the money over to the government.

It is not generally known that from 85 to 90 per cent of the wealth produced in industry is now being paid out in the form of wages. This is clearly set forth in a book published by the United States Department of Commerce under the title of "National Income in the United States."

During depression years, many companies dip into their reserves in order to maintain their distribution to labor, so that in these years the distribution runs over 100 per cent of the wealth they create.

In the past few years, the distribution has been on the basis of practically 90 per cent to employees and 10 per cent to stockholders. The average yield on all stocks is less than 3 per cent on the invested capital.

When the management of industry enters into collective bargaining arrangements, they are not representing the company—they are, in every true sense, representing the public. When they say they cannot agree to an increase in wages, they are, in fact, saying that they do not believe they can sell their product in competition at an increased price.

Because the public has so much involved in these negotiations, they should take an active interest in order to see that justice prevails. Wages are the means of distributing the national wealth back to the people who produce it. Each should share in proportion to his contribution.

If wages are ever set by force or the threat of force, without regard to justice, you have set up the conditions which will destroy democracy.

This matter of establishing acceptable national wage scales for the just distribution of wealth is of vital importance. Our democratic system of government is not safe until it is in operation and understood.

In Russia, Germany, France, Spain, Italy and Japan, the governments are prescribing the wage scale, and the question is settled beyond all argument from any individual or group.

In Great Britain, the Scandinavian countries and Australia, national wage scales have been arrived at by negotiations which seem to be acceptable to all parties concerned.

You hear the suggestion that we can increase the volume of our production and bring back prosperity by increasing our foreign trade. In the long run, foreign trade has to be kept in balance by the exchange of commodities.

When you consider that the costs of labor in the foreign countries range from 10 to 50 per cent of our labor costs, and assuming that they have approximately the same degree of efficiency—then for every hour of labor that we export, we eventually will have to import at least two hours of labor. Can you figure out how the unemployment problem can be permanently solved by putting one man to work on goods for a foreign country, and laying two men off because of the products we eventually will have to import?

Our competitive system has challenged every individual and every group to give his best in the creation and production of wealth. It has offered the opportunity for any individual to advance to a position of great responsibility, if he is willing to make the necessary sacrifices.

We have produced more wealth per capita than any other country operating under a different system and this wealth has been distributed on a broader base. At the present time we are placing too much emphasis on the distribution of wealth and not enough on how to produce it.

Where else in the world can you find a living standard of the people that expects the ownership of an automobile, a telephone, a radio, an electric refrigerator, and all other such conveniences.

Our apparent stability exists because of the tremendous inertia of our economic system and its ability to stand almost unlimited abuse.

With our great diversity of interests, any poison that starts in one part tends to become diluted or neutralized before the infection becomes general.

This tremendous mass has started to move toward inflation like a glacier creeping its way to the sea. At times the movement may be imperceptible and may lull us into the thought that there is no movement at all.

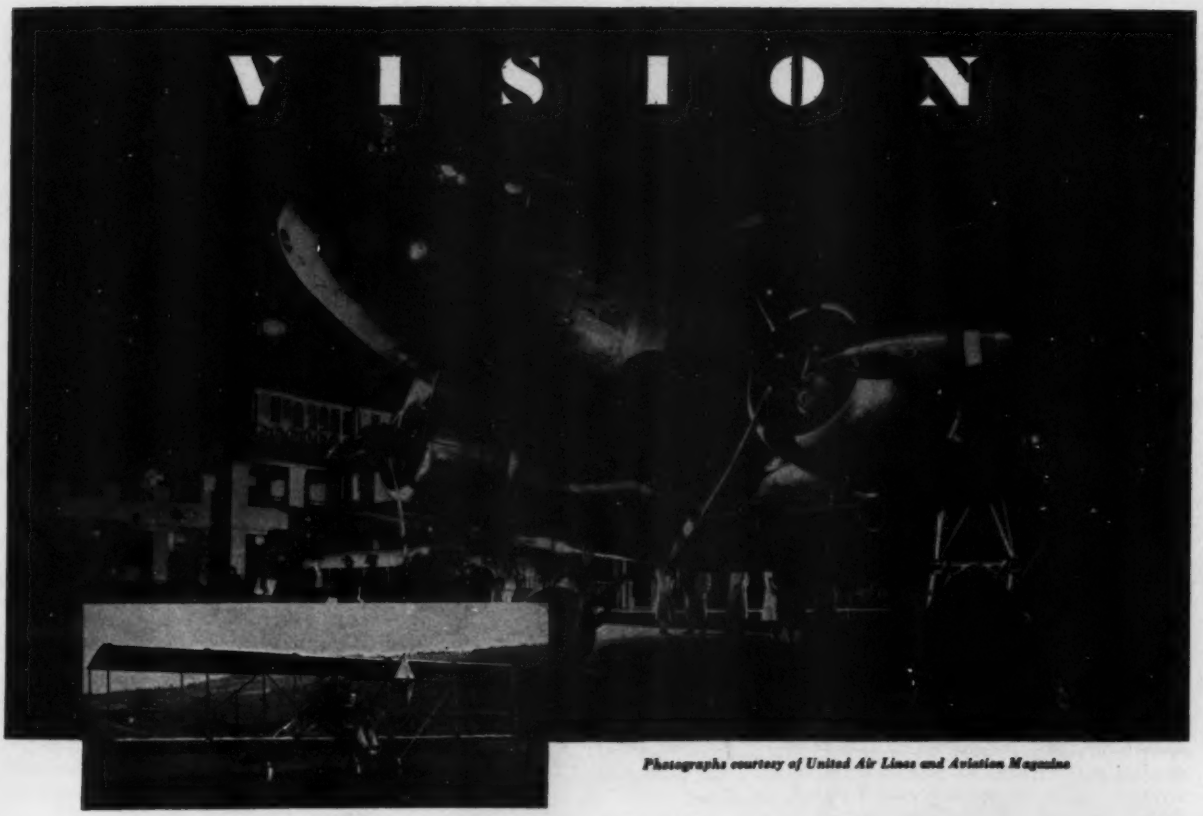
It will require a tremendous force to stop this movement and prevent ultimate disaster. Civilization needs the leadership of the technically trained men in industry to help work out a solution to these problems.

Will you accept this great responsibility to the future generations?

Our Patent System

CHARLES W. RIVISE
Casser and Rivise

It is because our forefathers had an abiding faith in individual initiative and free enterprise that they wrote into the law of the land a patent system based upon an entirely new principle; namely, that a man's invention is something peculiarly his own. Hence, our patent laws, unlike those of most other countries, require that the inventor, and he alone, shall make application for the patent. For the same reason, patents in



Photographs courtesy of United Air Lines and Aviation Magazine

Great scientific discoveries and inventions spring from extraordinary imagination and vision. It was this vision on the part of the Wright Brothers and others that brought about the development of our modern airplanes from the frail, uncertain "flying machines" of the early nineteen hundreds.

So, too, COLUMBIA visions the importance of research in the alkali industry by maintaining at Barberton, Ohio, one of the largest and most up to date research laboratories in the industry, complete with the most modern equipment, much of it specially designed. This research is supplemented by extensive pilot plant operations which bring the results of research up to the production stage.

We believe that through constant effort under such favorable conditions will come new developments, new conveniences and savings for our customers, and a still wider sphere of usefulness for the basic raw materials which COLUMBIA produces.

COLUMBIA PRODUCTS for the PAPER INDUSTRY

SODA ASH—For alkali makeup in soda process and kraft mills. For cooking and washing straw and old paper in board mills. Characterized by purity and uniformity. In convenient packages or in bulk.

CHLORINE—For bleaching all types of chemical pulp, for slime control in white water recovery systems. Highest possible purity. Newest and most modern equipment from small cylinders to 30 ton cars.

COLUMBIA

SODA ASH • CAUSTIC SODA • SODIUM BICARBONATE • • •
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Plant: Barberton, Ohio
CHICAGO • BOSTON • ST. LOUIS • PITTSBURGH • CINCINNATI • CLEVELAND • MINNEAPOLIS • PHILADELPHIA

this country are issued without any strings or conditions attached to them.

Recently, the patent system has been attacked on the ground that patents are either monopolistic or tend to foster monopoly, that they stifle competition, that they favor larger corporations and intrenched privilege to the detriment of smaller concerns and individual inventors, and that they cause unemployment.

Patents are issued only for new and useful inventions, and hence cannot be said to deprive the public of anything in which it already had an interest. Inventors are invariably stimulated by the existence of patents in their fields not only to devise improvements, but also to develop non-infringing ways of accomplishing the same result. The fact that new ways of accomplishing the old result can be patented induces men with capital to exploit the new invention in competition with the old.

Larger corporations have no greater advantages in the field of patents than they have in other fields. In fact, the ownership of a strong patent has often enabled an independent inventor or a small concern to deal on an equal basis with a very large corporation having unlimited resources.

It often takes as many as ten years for an invention to go from the idea stage to the point where it starts bringing a return to the people behind the invention. In some of the industries, particularly the heavy industries, this period may be greater than ten years. Hence, the patent term of seventeen years is in many cases entirely too short to adequately compensate the inventor for the time, effort, and money which he put into his invention.

It is also often stated that inventors keep their inventions pending as long as possible. This is only partially true. Most of the delay in getting a patent is generally due to the large number of applications that are always awaiting action in the Patent Office, the small number of patent examiners, and the inadequate classification system for patents.

I regret that space requirements make it impossible for me to discuss the hearings that were recently held before the Temporary National Economic Committee and the tentative recommendations which it made to Congress. It is my opinion, and I have so expressed myself to the committee, that the position of the individual inventor and of the small manufacturer was not adequately presented. This is reflected in the committee's recommendations, several of which have already been enacted.

Three of the provisions are to my mind particularly detrimental to the interests of the individual inventor and the small industrial establishment.

Effective August 5, 1940, the period within which an inventor may make public use or sale of the device of his invention before filing his patent application has been reduced from two years to one.

Effective August 7, 1939, the Commissioner was authorized in his discretion to require an applicant to respond to an Office Action within six months *or such shorter time, not less than thirty days,* as may be fixed in a written notice to the applicant.

The Temporary National Economic Committee also recommended a change in the term of the patent. At the present time, patents for every subject matter except designs are issued for seventeen years from the date of issuance. The recommended change would keep this period at seventeen years, but provides that the period shall in no case be more than twenty years from the date of the application.

The committee should investigate the common practice of obtaining disclosures from inventors and then filing conflicting applications in the Patent Office so that the invention may be pirated with impunity. The committee should investigate the refusal of certain concerns to pay royalties under any circumstances. The committee should look into the practice of "ganging up" on patentees, who seek the protection of the courts.

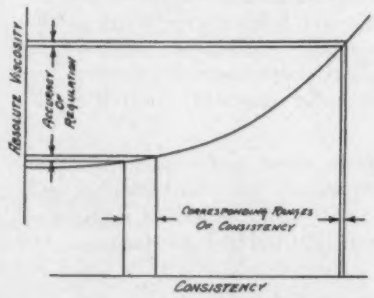
Consistency and Weight Regulation of Stock to the Paper Machine

FREDERICK WIERK
Johnson & Wierk, Inc.

Regulation of the weight of paper, as made on the paper machine, calls for some device or combination of apparatus which will pass to the paper machine the desired dry weight of material at a rate corresponding to the prevailing machine speed. The constituents of paper, however, must be fed to the machine in aqueous suspension, and any regulatory measures must be applied to the stock in water suspension.

Since the specific gravity of the suspended particles is almost the same as that of the water, no direct control by any actual weighing device is possible, and other properties of the suspension must be utilized to selectively operate any regulatory mechanism.

A search of the literature fails to reveal the identity of the genius who first discovered the fact that the viscosity of a



suspension of a given type of fibers in water might vary, in some fashion, with the percentage of those fibers in the suspension.

With this fact established, it became comparatively simple to use the viscosity of the suspension as a control point for the corrective regulation of the consistency of the suspension.

The usefulness of any apparatus based upon the relation between the consistency and the viscosity of paper stock is naturally limited to the range in which the viscosity versus consistency curve may show a considerable slope. Referring to drawing, you will note that, at the lower consistency, the curve is quite flat and a given change in viscosity is related to a much larger change in consistency than a similar change in viscosity at higher consistencies.

This illustration also brings out a very important consideration which should be very valuable to operators desiring to secure the best results with any type of regulator. It will be noted that a given accuracy of regulation, as provided by the apparatus, will show a narrower range of maintained consistency if the regulation is handled at higher consistency.

If we properly consider the problem of weight regulation as involving the separate and successive problems of consistency regulation followed by quantity regulation, we may proceed to set forth the attributes which should be possessed by any combination of mechanisms calculated to produce the desired results.

Beyond the technical requirements, there are obviously a number of practical operating requirements which must be possessed by any apparatus which is to receive the complete approval of the paper maker. The apparatus, of whatever form it may take, should be substantially constructed of materials resistant to any corrosive elements which may be present in the stock.

The apparatus should preferably be as simple as possible and, if possible, the working parts should be visible for a quick casual inspection.

In whatever form the apparatus may take, it should be easily and readily cleanable without disassembly.

In respect to determination of stock viscosity, most of the machines in common use can be rather sharply divided between the mechanical and the hydraulic methods.

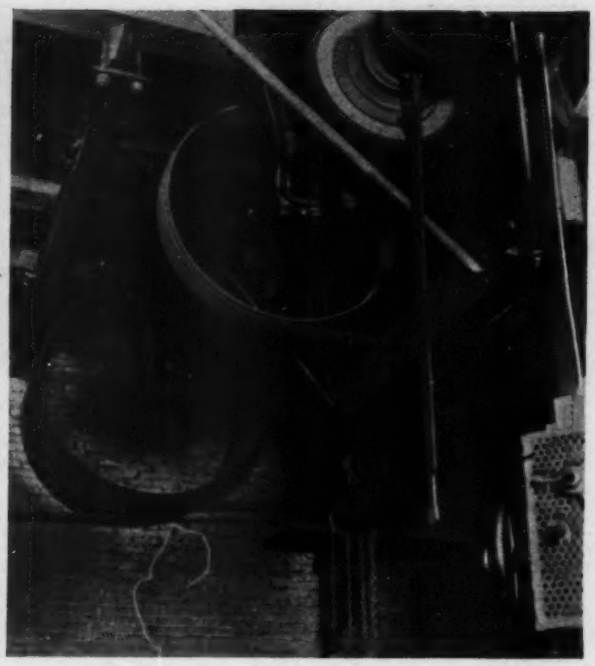
The mechanical determination of stock viscosity in consistency regulators is accomplished by a variety of devices generally described as "feelers," which may take the form of smooth cylinders, paddles, modified propellers, and the like. In most applications these "feelers" are revolved in the stock at a constant speed and any variation in the viscosity of the stock is indicated as a corresponding variation in the torque required to turn the feeler at that constant speed.

The method of measuring the torque applied to "feeler" varies considerably in different machines which use the feeler device. In any case the measuring mechanism is essentially a dynamometer of one form or another.

Almost every commercial device which we have had the occasion to study will, on careful analysis, show at least one or more factors which tend to invalidate the accuracy of the viscosity determination. These invalidating factors vary in nature and magnitude of effect; and many of the machines on the market do a creditable job of regulation in spite of inherent weaknesses.

Hydraulic means to determine the viscosity of paper stock may take the form of a friction-cylinder, a viscosity tube, or in some cases a relatively simple sluice. Variation of the viscosity of the stock will result in variation in head when a constant quantity is passed through the device.

As in the mechanical methods of viscosity



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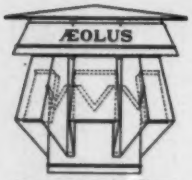

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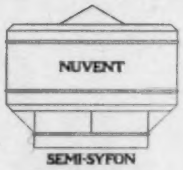

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determination, these hydraulic methods may involve extraneous factors which might considerably invalidate the viscosity determination. For example, for the head as displayed by stock passing through a "friction cylinder," the quantity should theoretically be constant. Actually it is almost impossible to develop constant flow through such a device and the head appears as a second approximation where the accuracy depends upon the fact that an allegedly regulated flow of the stock is taken from a preceding head box to supply the viscosity cylinder.

In these regulators employing hydraulic determination of viscosity, the head variations are measured by floats, by air pressure in a bubbling pipe, by the actual weight of the friction cylinder, or by the action of the stock on a loaded flap in a discharge sluice.

Assuming that the regulator has determined the viscosity of the stock with sufficient accuracy, it now becomes the duty of the device to add the proper amount of water to bring the stock down to the desired viscosity. It might be here pointed out none of these devices has yet been developed to increase consistency and the problem is always that of bringing the consistency down to a desired point.

The outstanding attributes which must be possessed by the dilution system are minimum time lag between determination and correction; and minimum tolerance in respect to variation allowed in final viscosity as delivered. Minimum or zero, if possible, hunting should be permitted.

Quite recently brought over from England, is a regulator based on head loss in a stream of stock traversing a sluice. The immediately apparent objection to the arrangement is the return, to the chest, of regulated stuff, and also the time interval between correction and determination. This regulator seems, however, to have satisfied several users in spite of its limitations.

Widely used in numerous European installations, is a regulator based upon the hydraulic gradient in a sluice wherein determination is made by a float in the general nature of a "sleigh." In this case the indicator float is not called upon to provide the power for operating the dilution valve, but simply gives its indication to a motor driven impulse transmitter so that the motor provides the necessary power.

Regardless of which scheme is used for either viscosity determination or for dilution valve control, the possibility of hunting may be reduced or eliminated by having the sampling point follow the dilution point as closely as is physically possible. This cuts down the volume of "off-consistency" stock which must pass before correction to desired conditions may be effected.

For the maintenance of constant head most of these devices involve a return of some stock to the chest. In some of these devices the arrangement is such that regulated (or in other words diluted) stock is returned to the chest. It is obviously more desirable to have the heavier unregulated stock returned to the chest so that the consistency in the chest is not thus reduced and the capacity of the chest in respect to dry fibers thereby diminished.

Schemes based upon viscosity will not operate when consistencies are low because the viscosity of stock below one per cent approaches that of water.

In 1930 a group of investigators made extensive experiments with a set-up based upon absorption of radiant energy by particles suspended in water. They used a controlled incandescent lamp as a source of radiant energy. A lens system was used to direct the light through the stock, and the transmitted light focused on a thermocouple.

The experiments were either not continued to the originally desired extent, or if so, we were unable to locate any written reports covering the completed work. It may be stated, however, that they did establish some relation between consistency and the transmission of radiant energy through the stock.

Some time later, in a West Coast pulp mill an analogous scheme was installed in rifflers, but a photoelectric cell replaced the thermocouple and the arrangement was assembled with commercially available electrical equipment.

In 1938, an extension of that arrangement was installed in a West Coast paper mill. Mounted in a waterproof fixture a 75-watt exciter lamp and a fixedly spaced photoelectric cell are immersed in the rifflers. The photo cell actuates an amplifier, the output of which is indicated and recorded on a recording milliammeter. To insure constant illumination a voltage regulator is used to eliminate any possible variation in the 110 v., a-c. source. To improve sensitivity, the amplifier and the photo cell are both supplied with d-c. rectified from the regulated a-c.

With the stock regulated as to consistency, it becomes a relatively simple matter to regulate sheet weight by controlling the flow of the regulated stock going to the paper machine.

There have been numerous machines developed and sold which are intended to directly control sheet weight.

One of these is fed with stock at a fixed head. Under this head the stock flows through a tortuous passage into a separate float compartment from which ia is discharged through an adjustable gate.

The float in the second compartment operates both the dilution valve and the gate, with the diluent being fed to the stock just before the stock leaves the first compartment of head box.

An older scheme was concerned with a "shovel" or pan against which stock under fixed head was jetted from a gate. The shovel was so linked to the gate that a less viscous stock, jetting farther out from the gate would serve to further open the gate. Linkage friction appeared to be an invalidating factor.

Since there are several hundred U. S. and foreign patents relating to this subject, we do not pretend to know all of them intimately, but we believe that we can discuss any usual (or unusual) problems which may concern you.

Metallurgical Control in the Fourdrinier Wire Industry

D. C. DILLEY, Metallurgist
The Lindsay Wire Weaving Company

Probably no wire product is confronted with more varied destructive conditions of service than is the fourdrinier wire. Fatigue to bending, under the action of corrosive paper stocks, combined with abrasion from suction box covers, makes the list of suitable metallic materials a small one. Phosphor bronze and brass wire have maintained their undisputed position in the field. No field of metallurgical research shows more need for a new alloy than does the fourdrinier wire industry. The day for the introduction of a new material is long overdue. When it does come, the material will probably combine the corrosion resistance of the stainless steels with the ductility and resistance to work hardening of the wrought phosphor bronzes.

Screen wire in stainless steel will always

"SUPERIOR TO ANY ROLLS HE HAS EVER USED!"

Some of the leading installations of Monel-covered rolls on Fourdrinier Machines:

242" Pusey & Jones "Kraft" Fourdrinier
240" Pusey & Jones "Kraft" Fourdrinier
236" "News" Fourdrinier
234" Pusey & Jones "News" Fourdrinier
234" "Dominion" "News" Fourdrinier
230" Rice, Barton & Fales "News" Fourdrinier
226" Pusey & Jones "Kraft" Fourdrinier
226" Pusey & Jones Fourdrinier
214" Beloit Fourdrinier
210" Beloit "Kraft" Fourdrinier
210" Pusey & Jones "Kraft" Fourdrinier
186" Rice, Barton & Fales Fourdrinier End
184" Pusey & Jones "Kraft" Fourdrinier
174" Rice, Barton & Fales "News" Fourdrinier
164" Rice, Barton & Fales Fourdrinier
156" Rice, Barton & Fales Fourdrinier
156" "Downingtown" Cantilever Type Board Press
142" Bagley & Sewall Fourdrinier
136" Pusey & Jones Fourdrinier
132" Rice, Barton & Fales Fourdrinier
98" Pusey & Jones Fourdrinier
86" Pusey & Jones Fourdrinier

FOR the past three years a South Carolina Kraft mill has been using Monel-covered Wire Rolls and Wet Felt Rolls, 15 in. dia. x 243 in. and 251 in. face, on 242 in. Pusey and Jones "Kraft" Fourdrinier. Read what this mill reports:

> ***"Our Paper Mill Superintendent is very emphatic in his expression that as to wear resistance, cleanliness and surface smoothness, the thirteen MONEL-covered rolls on our board machine are superior to any he has ever used."***

On your tube, dryer and press rolls Monel-covering provides a surface which, without special attention, stays smooth and clean for years. This covering resists corrosion by alkaline and acid stocks and white water... it cannot dezincify... and it resists wear by doctors, fibre and fillers.

The roll covers are applied by the Youngstown-Pressure-Welding-Process which firmly bonds to the roll core a shell of hard, tough Monel sheet, 1/16 in. or more in thickness. *Monel-covering of new or old rolls can be furnished by all prominent paper machinery builders. Write to them today, or address:*

THE INTERNATIONAL NICKEL COMPANY, INC.
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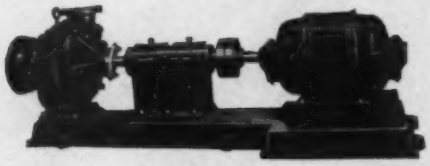
"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

STOCK PUMPS

by



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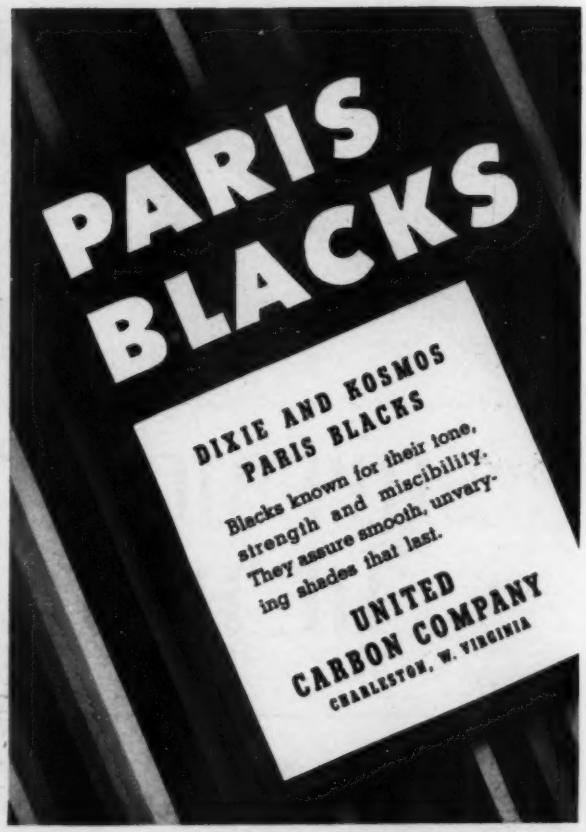
The **FREDERICK** stock pump was designed in collaboration with paper mill engineers and paper mill operators. Operating requirements as well as scientific design were carefully considered. We learned that on the lower consistencies of stock certain clearances could be maintained in order to secure high efficiencies. We learned, also, that on heavy stock different design was required and that it was often necessary to sacrifice some efficiency in order to provide a unit that would successfully and continuously handle the high consistencies without clogging and without shutdown. Pumping is the very heart action of a paper mill and continuous, trouble-free operation of the pumping equipment is absolutely necessary to keep manufacturing costs low.

Each **FREDERICK** stock pump is a separately engineered unit. Each pump is built especially for the operating conditions to be met, taking into consideration the nature of the stock to be handled, the consistency, the piping layout and all the other items that must be carefully considered in order to furnish the unit best suited for the exact operating conditions specified.

When you buy a **FREDERICK** pump you purchase a unit that is **GUARANTEED** to meet the operating conditions for which it is sold.

The FREDERICK IRON & STEEL CO. · FREDERICK, MD.



have its place in corrosion-resistant applications, in locations where little flexing is required. At its present stage of development, it is unlikely that it will become applicable to the fourdrinier wire.

Phosphor bronze retains its position by right of laboratory investigation as well as mill life records. Until some new alloy is developed which will show higher corrosion fatigue than this alloy, the life of the fourdrinier wire will very probably not be materially extended beyond its present range.

Most manufacturers produce their own wire for weaving purposes. As many as 200 sizes and types of wire must be on hand for weaving in a large shop. These vary, generally, from 0.002 in. to 0.018 in. in diameter, the sizes changing in quarter-thousandths inch on the diameter.

Wire is generally received in 14-in. coils at from No. 15 to No. 20 B & S gage annealed soft for redrawing.

The original coils are analyzed chemically either in a large commercial laboratory or in a small chemical laboratory maintained at the plant. Cleanliness of the material is also checked by means of the metallurgical microscope, where any inclusions or faults in the structure of the wire will appear when the grain size of the metal is checked to ascertain the extent of the softening anneal.

Break down wire drawing machines (utilizing 8 to 10 diamond dies) take the raw material at approximately 0.060 in. diameter and reduce it to approximately the cold working limit of the material being drawn. The extent of original drawing affects the strength of the finished wire, so great care must be taken to insure uniformity of processing. At the take-up end of the first drawing machine, the wire has been reduced to some size approximating 0.020 in. diameter. It is coiled on 8-in. blocks at the take-up end, and taken in 40 lb., tied, coils to be softened by annealing before being reduced to sizes suitable for weaving.

Steam or gas atmosphere furnaces protect the surface of the wire from excess oxidation when it is being annealed. The temperature of anneal (about 1000 deg. Fahr.) is controlled automatically by suitable indicating-recording potentiometer controllers. The time of the anneal is important, for wire which might be suitable for other products may be incorrectly annealed for weaving wire.

Following this process anneal, a slight pickle in acid is often given to insure an absolutely clean surface for drawing to the finished sizes. The modern wire shop employs a man to constantly check on the condition of the drawing compound, and to insure maximum diamond die efficiency by repolishing the bore of these stones as soon as they show any slight imperfection.

Wire is finish drawn from the process annealed coils on to steel spools. This wire is then ready for the final step in processing. The material is in the hard drawn state, and it then receives its final critical annealing to make it soft enough for the required weaving operations, and yet hard enough to withstand the various loadings placed on the finished wire cloth in the paper machine. The anneal is accomplished in multiple strand furnaces, the wire being pulled through alloy tubes, surrounded by a heating muffle. The finish remains bright and clean for an atmosphere in the annealing tubes excludes all oxygen, water vapor, and sulphur compounds which might tarnish the product.

Representative samples of the wire shop's daily production are checked by a laboratory staff for roundness, surface characteristics, etc. A tensile testing machine designed especially for fine wires is used to determine ultimate strength, elongation, and yield strength.

The shoot wire is generally annealed to a softer temper than is the warp, for in the fourdrinier, it is the warp which does the "work" of the cloth, the shoot being the filler.

In the weaving operation, many of the characteristics of the finished wire cloth are formed. The rigidity of the cloth, its resistance to curling, and the actual count of the mesh all originate in the weaving operation. By varying the size of the shoot and warp wires, and their strength, numerous types of cloth may be produced for the production of various papers. Fourdrinier cloth is characterized by a shoot count which is practically always lower than the warp count. Thus, newsprint is made on approximately 60 by 42 weave (60 warp wires and 42 shoot wires per inch of cloth), while some thin cigarette papers will require a mesh count of 70 by 210, using triple warp wires (grouped by three's).

When the cloth has been cut to proper length, the two ends must be joined to form the fourdrinier wire. Because any

who never appear on the payroll

Watching, checking, recording—more than three hundred faithful automatic instruments guard the uniformity of Hammermill papers every second of the twenty-four hours.

Temperatures, pressures, weights, humidity, every important variable factor in the Hammermill manufacturing process leaves its life history on the chart of one of these instruments. There to be watched and controlled by skilled workmen, there to be studied later for future guidance.

Never-ending watchfulness is the secret of Hammermill uniformity. These mechanical guardsmen, with their ceaseless vigilance, are important members of the Hammermill organization even though their names don't appear on the payroll.

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variation in opening between the shoot wires at the seam will cause non-uniform drainage of the pulp, with the consequent marking of the paper being formed, measurements must be taken in the shop all during the seaming operation by means of measuring microscopes to insure a uniform spacing of the wires at the seam.

There are four general types of seams now in use: the all-sewed seam, the soldered and sewed seam, the silver or hard soldered (brazed) seam, and the welded seam.

The most remarkable development in the seaming of fourdrinier wires has been the application of gas and electric welding to the joining of warp wires. When one considers the rapidity with which the seam can be introduced into a wire, as many as 14,000 unit welds being made in one 8-hour day by a single operator, the fruits of industrial research will be appreciated.

Ecourrou and others have suggested mechanisms for testing resistance to abrasion, but these tests do not evaluate the combined influence of reverse bending and abrasive wear, although they may run in actual millwaters, or aluminum sulphate solutions. The dynamic bend test for both single strands and for strips of woven wire gives an excellent indication of the resistance of wire to reverse bending. There is no test which will indicate mill life, for no two mills subject the fourdrinier wire to like conditions of wear.

It should be pointed out that the wire has its most rigid inspection on the stretcher operation following seaming. Every inch of the cloth is inspected as it passes over the stretcher roll. A final check on measurement is then made before the wire is wound on three poles. The ends of the poles are securely tied and nailed to end blocks to prevent shifting of the wire, and the poles and wire are wrapped in cellulose wadding before being lowered into the box.

During transit, the wire may be severely damaged by end shock or dropping of the box. Both these types of damage are quite different from a pole mark, which can be caused by careless removal of the poles from the wire. Damaged areas, like any small indentation in the wire, are apt to wear through, causing early failure. Most manufacturers prefer to be advised when the mill discovers damage of this nature so that the wire can be returned and the damaged spot removed, rather than to have the paper mill run the wire in such condition or attempt to remove the spot themselves.

The use of all bronze fourdrinier wires has done much to avoid seasonal and natural corrosive conditions.

In recent years, when claims have been made on wires because of short life on the machine, it has been the practice for the manufacturer to ask for the return of the damaged or failed wire. Paper mill operators must realize the real value the wire manufacturer gains from the inspection of these used wires, and that, through this medium of exchange of comments and ideas, the greatest strides may be taken in improving wire life.

The Design of Gas Absorption Equipment for the Production of Chlorine Water

ROY P. WHITNEY[1] and EDWARD VIVIAN[2]

Among the unit operations of chemical engineering, gas absorption is one which has received and is receiving a great deal of attention in the literature. However, very little has appeared regarding those absorption operations which find use in the pulp and paper industry, although equipment for this purpose is indispensable in many mills, particularly in the preparation of bleaching solutions and in the preparation of cooking acid for the sulphite process.

Because of the present widespread trend towards chlorination as the first stage in the bleaching process, the absorption of chlorine in water for the preparation of chlorine water bleaching solutions has assumed increasing importance. It is the object of this paper to discuss the design and operation of equipment for this purpose, based upon what are believed to be the most reliable data available.

The absorption of a gas by a liquid consists of the transfer of a material from one phase (gas) to another (liquid). In this process it is well known that, for given conditions, there is some limiting value of the concentration of the dissolved gas in the liquid beyond which it is impossible to go. This limiting condition represents equilibrium for the system, and is the solubility of the gas in the liquid.

Inasmuch as transfer from the gas to the liquid takes place because the two phases are not in equilibrium, it follows that, as equilibrium is approached, the rate of transfer will fall off, or, in other words, that the rate is proportional to the distance from equilibrium. This distance is called the driving force. These three factors which govern the rate of absorption may be combined in the following equation, which is common to many of the unit operations of chemical engineering:

$$\text{Rate} = \frac{(\text{area})\ (\text{driving force})}{(\text{resistance})}$$

The major resistance to mass transfer are usually considered to be in two relatively "stagnant" fluid films, one of gas and one of liquid, which are in contact at the gas-liquid interface.

Theoretically, a separate driving force can be expressed for either film. Through the gas film, it is considered to be the difference in partial pressure of the gas being absorbed, from the main body of the gas to the interface. Likewise, through the liquid film, it is taken as the difference in concentration of the dissolved gas, from the interface to the main body of the liquid. The two phases are considered to be in equilibrium at the interface.

It is evident that the relative magnitudes of the resistance of the two films may vary over wide limits. For example, in the case of a very soluble gas, the resistance of the liquid film is small compared to that of the gas film, because the solute is removed rapidly from the liquid film. The rate of absorption is, therefore, governed by the gas film, which is said to be "controlling."

Since chlorine is only slightly soluble in water, it is to be expected that its absorption will be a case where the liquid film controls, and investigation of the system bears this out.

The experimental apparatus consists essentially of an absorption tower, 14 inches in diameter and 10 feet tall, made from a piece of wood pipe coated on the inside with an asbestos roofing cement. In one series of runs the tower was packed to a depth of 8 feet with 1½-inch graded coke, and in other runs with 1-inch Raschig rings. Chlorine gas was mixed with air to any desired concentration, and introduced to the bottom of the tower. Tail gas was withdrawn from the top by means of an air ejector. Water was supplied to a distributing plate at the top and discharged from the bottom through a liquid seal. Entrance and exit gas lines and exit liquor lines were of glass.

Seventeen runs for the determination of capacity coefficients with coke packing, and forty-four runs with Raschig ring packing are reported. The water rate through the tower was varied from 900 to 6,700 pounds per hour per square foot, the water temperature from 36 to 73 deg. Fahr., and the gas rate from 15 to 60 pounds of inert gas (total gas less chlorine) per hour per square foot. For purposes of simplification, the entering gas composition was maintained at about 20 per cent chlorine, although a 40 per cent gas was used in one series of runs in order to test the validity of the equilibrium data.

All of the capacity coefficients thus obtained are shown in chart (Figure V*)

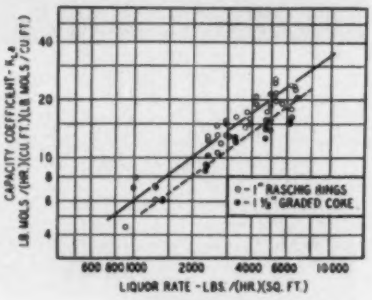

Figure V

plotted against liquor rate on logarithmic co-ordinates. Two straight lines are defined, one for Raschig rings and one for coke, showing that the coefficients are 15 to 20 per cent higher in the case of the former. Both lines have been drawn with a slope of .75, indicating that K_La is proportional to $L^{0.75}$ (L = liquor rate, pounds per hour per square foot).

Over the range which was covered, the gas rate appears to have no effect on the value of the coefficients. The effect of water temperature also appears to be negligible within the precision of the data, in that no consistent variation can be noted. For use in engineering design, it is sug-

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(2) Asst. Director, Bangor Station, M. I. T. School of Chemical Engineering Practice, Bangor, Maine.

(*) The complete presentation of this paper included nine figures.

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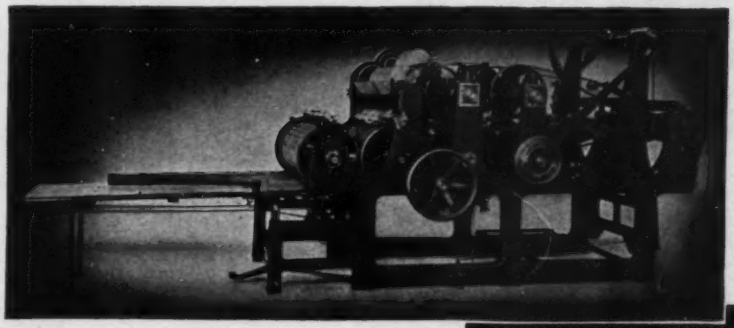

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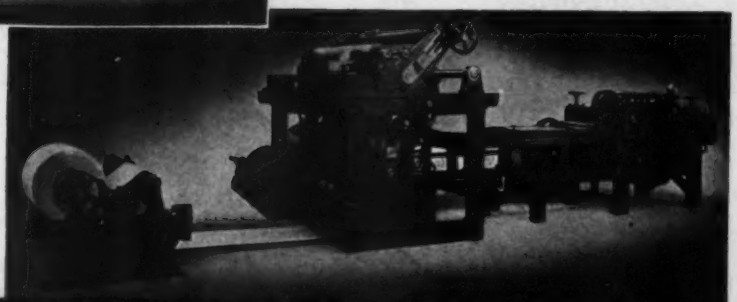

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gested that K_La be considered to vary with the water rate as shown in Figure V, and with no other variable.

The idea of using some form of tower in which gas is passed countercurrent to liquid for the transfer of material from one phase to another is by no means new. Such equipment has, in general, been built rather than designed, with the result that installations have been made with several times the necessary capacity, and the accompanying excessive first cost and high maintenance and operating charges.

During the past few years, however, considerable effort and research have greatly increased our knowledge of absorption and have permitted the formulation and use of some general rules which greatly simplify design calculations.

In the design of an absorption system the variables to be considered may be listed as follows: (1) the temperature and pressure at which the operation is carried out; (2) the quantity and composition of the feed gas, or the quantity and composition of the efficient liquor; (3) the ratio of liquor to gas rates; (4) the cross sectional area of the tower; (5) the packing material used; and (6) the height of the packed section, or the fraction of the solute in the feed gas to be absorbed.

In most cases one or more of these variables will be fixed by the specified conditions which the system is to satisfy. Furthermore, in selecting the optimum values for the remaining variables, the following costs must, in general, be considered: (1) the initial cost of the empty tower and its installation; (2) the cost of the packing material; (3) the cost of the absorbing liquor, or the cost of the feed gas; (4) the cost of power for the gas blower and the liquid pump; and (5) the cost of the solute gas losses.

The temperature at which absorption takes place for cases where the liquid film is controlling is that of the liquid film. Because of the high specific heat of the liquid relative to the gas, this is essentially the average temperature of the liquid passing through the tower.

From the data presented in the first part of this paper, it is found that the capacity coefficient of the absorption of chlorine in water is practically independent of the temperature of the liquid within the range commonly used (35 deg. to 70 deg. Fahr.).

There is, however, a lower limit to the temperature which can be used. At high partial pressures of chlorine over water, a brownish liquid, known as chlorine hydrate, $C_{12}.8H_20$, forms at low temperature. On warming, this compound decomposes rapidly and liberates a large amount of chlorine gas. To safeguard against this, a minimum temperature of 50 deg. Fahr. is considered good practice.

During the summer season the water temperature in many mills rises to 70 deg. or 80 deg. Fahr. Should available water temperature rise much above this, the possibility of cooling the water or of using well water should be investigated, to determine whether or not there will be a net saving when the cost of cooling equipment is balanced against savings in tower costs.

Usually in the design of an absorption system either the quantity of feed gas and its composition or the quantity of liquor and the desired composition are fixed. In the case of absorption systems for chlorine water bleach production, it is the quantity and composition of the bleach liquor that is fixed, and the quantity and composition of the feed gas are adjusted to supply the necessary chlorine.

The next factor to be considered is the ratio of liquor to gas rates, L/G. In various types of equipment, and subject to externally imposed conditions, this ratio varies over wide ranges.

Once the relative values of L and G have been fixed, the absolute value of L (pounds per hour per square foot) can be determined and the cross-sectional area of the tower can be calculated by dividing the desired hourly production rate (pounds per hour) by L.

There are three common criteria for estimating optimum liquor rate. They may be listed as:

1. The rate which will cause "loading."
2. The rate which will cause "flooding."
3. An economical maximum liquor rate, which is independent of gas rate below loading.

As the gas velocity through the tower at a given liquor rate L is increased, a velocity is finally reached where the pressure drop increases at a rate greater than the 1.8 power of the velocity. This point is referred to in the literature as the "loading point," and must not be confused with the "flooding point" where the gas bubbles violently through the liquid. The loading point velocity is considerably below that at which flooding occurs. Holloway [Sc. D. Thesis in Chem. Eng., Mass. Inst. Tech. (1939)] reports the results of calculations on the economic balance for determining the optimum value of L. It was found that at the loading velocity, charges for the tower and power costs are of the same order of magnitude. Since the power cost decreases rapidly with increase in tower area, he recommends the optimum gas rate to be 75 per cent of the loading velocity at a given liquor rate. If the loading velocity is known as a function of liquor rate, this can be translated into terms of an optimum liquor rate.

For cases where data on loading velocity are not available, but flooding velocities are known, Holloway recommends using one-third to one-half of the flooding gas velocity.

For cases where the rate of absorption is controlled by the liquid film, Sherwood and Holloway (Paper to appear in Trans. Am. Inst. Chem. Eng.) have shown that there is an economical maximum liquor rate, L, for a given type of packing. These maxima are based on theoretical considerations of data on capacity coefficients at various liquor rates and are independent of gas rate at gas rates below the loading point.

In selecting the type of packing to be used, the factors to be kept in mind are (1) high capacity coefficients, (2) low pressure drop, and (3) low initial cost. Of the wide variety on the market, 2-inch rings appear to be the most satisfactory for the relatively small towers required for chlorine water production, in that they have low cost per unit volume, low pressure

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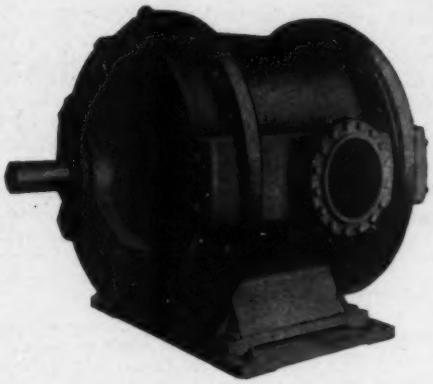

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drop, and capacity coefficients which are only 20 to 25 per cent less than for 1-inch rings.

For a case where the production of a given liquor rather than the recovery of the solute is the chief concern of the designer, there is another method of attack which will give a better optimum tower design, although the calculations are somewhat more involved. Chlorine water produced by the absorption of chlorine in water almost always uses as a source of chlorine electrolytic cell gas or gas from a liquid chlorine evaporator. With a reasonable amount of care, the chlorine concentration in the feed gas can be maintained fairly high, usually about 80 per cent. Taking advantage of this high concentration of chlorine in the feed gas, the optimum design of the tower becomes a balance between the cost of maintaining a high concentration of chlorine in the feed gas plus the cost of solute gas losses in the tail gas and the charges for the tower.

From economic calculations of the tower height against the fraction of chlorine lost in the tail gas, the optimum for a given L and entering gas concentration appears to be that height which will absorb 99.5 per cent of the chlorine fed to the tower. With this variable fixed by this approximation, the remaining design consists of a balance between the cost of maintaining the desired chlorine content of the entering gas and the tower height.

Investigation shows that this method gives an optimum tower only slightly smaller using a more concentrated gas than the former method of design. The similarity between the optimum designs as obtained by these more or less independent approximate methods illustrates well their applicability in simplifying design calculations, especially where the costs involved are relatively small and extreme accuracy is not justified.

The preceding discussion of chlorine water tower design has dealt with the operation of a single isolated unit. In many mills, chlorine water bleaching is only the first of a series of stages in the bleaching process. In a typical three-stage bleaching process, the chlorine water bleach is followed by a caustic extraction stage, and then by a bleach with calcium hypochlorite, the so-called lime bleach. The calcium hypochlorite solution is prepared by absorbing chlorine gas in a lime slurry using a variety of contacting equipment ranging from mere mixing boxes to spray towers. When both chlorine water and lime bleach are used, it is common practice to use the same source of chlorine for both operations by passing the tail gas from the chlorine water tower through the calcium hypochlorite tower. This system operates very satisfactorily, since chlorine is so soluble in limt that the dilute gases can be effectively stripped. The fact that the tail gas from the chlorine water tower must meet the requirements of a subsequent operation, (that is, contain a definite amount of chlorine) places certain restrictions on the design of the chlorine water tower and gives rise to a situation which is more or less unique in absorption. Because of this, some of the short-cuts of design mentioned above are not applicable.

Acknowledgment

The capacity coefficients presented in this paper were calculated from data obtained in test work by students in the School of Chemical Engineering Practice. Their cooperation in this effort is acknowledged. The authors wish to express their appreciation to the management of the Eastern Corporation for aid in the construction and operation of the experimental apparatus and for permission to publish these results.

Influences of Paperboards and Adhesives on Strength Properties of Corrugated Fiberboards

D. W. McCREADY

Associate Professor of Chemical Engineering
University of Michigan

Five different sets of liner boards and of corrugating boards were used to fabricate seven series of corrugated fiberboards, of which six series were "A" flute boards and one series "B" flute boards. Each series contained boards made with each of two or more different adhesives. The adhesives used were silicate, silicate-clay and starch.

The corrugated fiberboards were made on commercial machines by the usual operators. The machines operated previous to the test runs with starch or combined starch and silicate adhesives. During the manufacture of the test boards, machine adjustments remain nearly uniform and operating speeds were kept uniform. The combinations of paperboards used, the adhesives used, the clearances on adhesive transfer rolls or doctors, and the operating speeds are given in Table 2*.

All tests reported were made in an atmosphere controlled to conditions of 70 deg. Fahr. and 50 per cent relative humidity. Samples were preconditioned 24 hours in an atmosphere which approximated 40 per cent relative humidity, and they were finally conditioned at least 48 hours at the testing conditions.

Caliper, basis weight and Mullen determinations were made according to recognized procedures. Crush tests on the paperboards were made on clyindrical columns one-half inch high and six inches in circumference.

Beam tests, except for boards in series 5 and 6, were made on a Schopper Tensile Test machine, which was adapted with a beam testing fixture. This fixture incorporated a dial micrometer for measuring deflections.

Column tests on corrugated board were made on a tester which has been previously described (McCready and Katz Engineering Research Bulletin No. 28, University of Michigan—Feb., 1939). This tester was modified to accommodate columns up to 12 inches long. The columns were tested with flat and free ends.

Flexing tests were made on the beam testing apparatus previously described (McCready and Katz Engineering Research Bulletin No. 28, University of Michigan—Feb., 1939). The deflection indicating device was removed. A flexing load was obtained by alternately raising and lowering the pail, which, with additional lead shot, comprised the load. This was done by a platform which was raised and lowered by

*The complete presentation of this paper included seven tables.

Table 2—Combined Boards

Designation	Paperboards	Flutes	Adhesive	Roll Clearances		Machine Speed	Mullen lbs.
				Single Facer	Double Backer		
				ins.	ins.	ft./min.	
1KCX	Liner (1L) Kraft	A	Silicate	0.008	0.010	200	265
1KCZ	Corr. (1C) Chestnut	A	Starch	0.008	0.010	200	278
2KSY	Liner (2L) Kraft	A	Silicate-Clay	0.0095	0.0105	150	344
2KSX	Corr. (2C) Straw	A	Silicate	0.0095	0.0105	150	328
2KSZ		A	Starch	0.0095	0.0105	150	333
3KCX	Liner (3L) Kraft	A	Silicate	0.011	0.010	185	326
3KCZ	Corr. (3C) Chestnut	A	Starch	0.010	0.0085	185	328
4JSX	Liner (4L) Jute	A	Silicate	0.008	0.012	110	286
4JSZ	Corr. (4C) Straw	A	Starch	0.016	0.011	110	285
5KKX	Liner (5L) Kraft	A	Silicate	0.0115	0.009	110	223
5KKY	Corr. (5C) Kraft	A	Silicate-Clay	0.0115	0.009	110	222
		A	Starch	0.0115	0.009	110	244
6KKX	Liner (5L) Kraft	A	Silicate	0.019	0.019	110	229
6KKZ	Corr. (5C) Kraft	A	Silicate-Clay	0.019	0.019	110	223
		A	Starch	0.019	0.019	110	241
7KSY	Liner (2L) Kraft	B	Silicate-Clay	0.0095	0.0105	150	310
7KSX	Corr. (2C) Straw	B	Silicate	0.0095	0.0105	150	301
7KSZ		B	Starch	0.0095	0.0105	150	320

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a cam. The travel of the platform was adjusted so that all load on the beam was released when the platform was at the top of the cycle, and the load was applied as the platform approached the bottom of the cycle.

The Data from the beam and column tests offer several bases for comparisons of some of the factors influencing the strength of corrugated boards. However, comparisons between series of the boards must also consider other conditions. The different series of boards were made on different machines. Boards in series 3 were made with a machine which gives in effect two fingerlines which alternate on the sides of the boards about two inches apart. Boards in series 4 were not well made for they showed areas of spotty or missing adhesion between corrugating and liner boards. Boards in series 6 were made with greater than normal amounts of adhesives. Boards in series 7 are B flute boards. The fiberboards within a series are comparable, as machine conditions were uniform, thus comparisons may be made of the influence of the adhesives on properties of the corrugated boards.

The influences of the various combinations of paperboards on the ultimate test values of the corrugated fiberboards is not fully revealed. Comparisons of the ultimate test values obtained on the corrugated boards in series 1, 2, 3, 4, and 5 reveal that, for comparable boards, no one combination of paperboards was predominantly stronger than other combinations in all tests. The boards in series 5 appear to be the strongest on an average. These boards were very well made. The boards in series 4 were exceptionally strong when tested as beams with corrugations perpendicular to beam length, and they were more flexible than the other boards.

The influences of the adhesives used in the manufacture of the corrugated boards, on ultimate strength characteristics of the boards, are readily apparent. Comparisons between silicate and silicate-clay adhesives, series 2, 5, 6, and 7, show that in two instances corrugated boards made with silicate-clay adhesives are apparently stronger than comparable boards made with silicate adhesives, but the reverse is apparent in the other two instances. Comparisons between boards made with starch adhesives and boards made with either silicate or silicate-clay adhesives in all the series, show that the boards which were made with either of the silicate adhesives were always stronger than the comparable boards made with starch adhesives, except when the boards were tested as short columns with corrugations horizontal. The results of the latter tests do not show definite differences, which is to be expected as failures occurred due to telescoping between glue lines.

The values of the stiffness factors show the same general conclusions that were stated above, namely, that no one combination of paperboards produced the stiffest fiberboards under all test conditions, and that for comparable boards, the boards made with silicate and silicate-clay adhesives in most instances had about the same stiffness, and the boards made with either of the silicate adhesives were stiffer than the boards made with the starch adhesives. If it is considered that the best index of the stiffness of fiberboard is the EI value computed from the elastic limit data on a beam tested with corrugations parallel to beam length, and this should be true for adhesive comparisons, then it appears as if the adhesive used had, in most instances, greater influence on the stiffness of the corrugated board than did the paperboards from which the corrugated board was made. Another important factor is, of course, the quality of the fiberboard and those boards which were poorly made, series 4 are not as stiff as the others.

The desire to measure fatigue characteristics of corrugated fiberboards led to the testing of boards with flexing loads.

The results of the flexing test indicate that the fatigue resistance of corrugated fiberboard is closely related to ultimate strength. The separate test pieces gave widely varying results and it is considered that flexing tests magnify the effects of poor fabrication.

Acknowledgments: The assistance of the Technical Committee of the Sodium Silicate Manufacturers Institute in providing the corrugated boards in consultation regarding the research and in supporting this research is greatly appreciated.

The Effect of Water Hardness on the Formation of Floc From Sodium Aluminate

LEWIS B. MILLER[1] and RALPH L. LANZ[2]

Water hardness is caused by the presence of soluble salts of calcium and magnesium, commonly present in the form of bicarbonates, sulphates or chlorides. A search of the technical literature appeared to indicate that no systematic investigation had been made of the effect of calcium and magnesium salts in concentrations such as are found in hard waters upon floc formation from sodium aluminate present in concentrations such as are used in paper manufacture. The present article presents the results of an experimental investigation of the reactions between solutions of sodium aluminate and of calcium or magnesium salts in the indicated ranges of concentration and in regions of relatively high pH.

A survey of the literature on water hardness in the United States was made in order to determine with some precision the range of hardness which it was desirable to investigate experimentally. A survey [Collins, W. D.; Lamar, W. L.; and Lohr, E. W.: "The Industrial Utility of Public Water Supplies in the United States, (1932)"—Geological Survey Water—Supply Paper No. 658 (1934)] published in 1934, shows that the average annual hardness of the larger public water supplies varies as follows for the different states: Hardness in parts per million, 1 to 60—States in which the average annual hardness of the larger public water supplies lies within the indicated range—Washington, Oregon, Mississippi, Alabama, Georgia, South Carolina, North Carolina, Virginia, Maryland, Delaware, Maine, New Hampshire, Massachusetts, Connecticut, and Rhode Island. 61 to 120—Montana, Idaho, New York, Vermont, Pennsylvania, New Jersey, West Virginia, Kentucky, Tennessee, Arkansas, and Louisiana. 121 to 180—California, Nevada, Utah, Colorado, Wyoming, Oklahoma, Texas, Missouri, Minnesota, Wisconsin, Michigan, Ohio and Florida. Hardness in parts per million, Greater than 180—Arizona, New Mexico, North Dakota, South Dakota, Nebraska, Kansas, Iowa, Illinois and Indiana. These data represent average values. Many individual values range up to 1,000 p.p.m. of hardness and a small percentage consider-

(1) Chemical Engineer, Keasbey & Mattison Co., Ambler, Pa. (2) Chemist, Keasbey & Mattison Co., Ambler, Pa.

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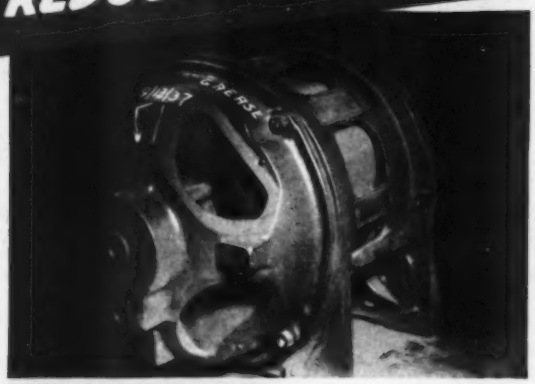

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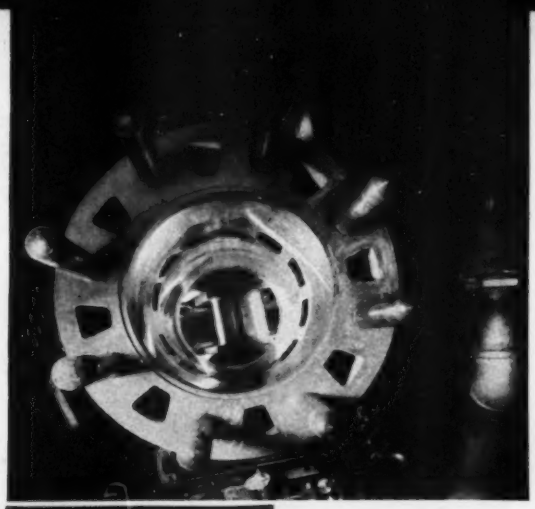

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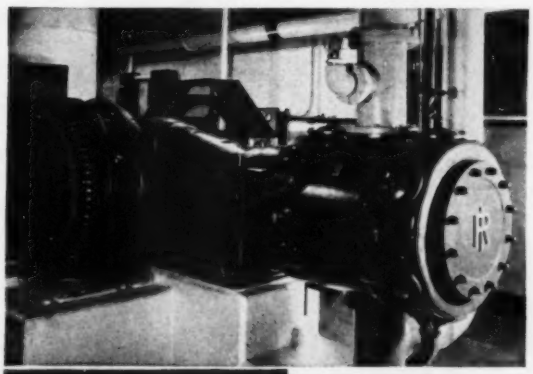

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ably exceed even this value. An arbitrary and moderately dilute solution of sodium aluminate (from the paper manufacturing viewpoint) was, therefore, chosen (410 p.p.m. of sodium aluminate in distilled water) and to this was added calcium or magnesium salts in small increments up to concentrations of about 5,000 p.p.m.

The results obtained in this investigation are purely of a preliminary nature and cover only a narrow range of pH. Investigations covering a number of concentrations of sodium aluminate and a greater range of pH values should be made in order to cover this subject more fully, and the writers of this article hope to extend this work at some future date. The present results indicate very clearly, however, that the hardness of the water used in paper manufacture may have a decided influence upon aluminate flocculation. This is particularly true where the hardness consists of an appreciable percentage of magnesium salts, for these salts have been shown to have a pronounced effect upon the pH range of flocculation and the character of the floc formed from sodium aluminate.

Retention of Fillers

S. W. MARTIN[1] and W. R. WILLETS[2]

A brief survey of the literature bears out the fact that there is considerable difference of opinion regarding the mechanism of retention and even in the empirical effect of varying different factors. Such inconsistencies may be readily explained by the complexity of the cellulose fiber itself, to say nothing of the other materials which may enter into the system: size, starch, filler, dyestuffs, alum, etc.

The simplest system, which lends itself most readily for analysis, consists of cellulose fiber and filler. In such a system Willets has found that when 7.5 per cent titanium dioxide was added, only 17.9 per cent of the total was retained in the formation of paper from a domestic bleached sulphite by means of a laboratory technique. Roschier, using different technique, had previously reported a retention value of 32 per cent when 10 per cent clay filler was added on a fiber weight basis.

The results obtained when the fiber-filler furnish was dumped on the screen can be attributed entirely to a filtration effect in which a certain percentage of the total filler was mechanically trapped. But because of the colloidal dimensions of the particles and the electronegativity of both filler and fibers, most of the pigment passed through the interstices of the fiber mat.

The object of retention studies is to minimize the loss of filler. This can be accomplished by (1) flocculation of the pigment particles, with a corresponding increase in size so as to improve the filtration capacity of the mat, and (2) electrokinetic cementation, in which the cellulose is made electropositive through preferential adsorption.

The effect of alum when used without rosin size on the retention of titanium dioxide and clay has been studied under widely varying conditions of experimental technique. All the evidence tends to show that the actual deposition of positive alumina on the fiber is of fundamental importance in the retention of fillers. It may be concluded that flocculating effects, due to aluminum ions, would not be any greater than those resulting from magnesium ions. Retention is, therefore, far more dependent on the cementation mechanism accompanying the hydrolysis of alum.

Incremental ash resulting from the use of rosin was not only small, but virtually constant, regardless of the amount of alum added. This leads to the indication that the hydrolysis of alum and its adsorption upon the fiber proceeds independently of the rosin size and thus is in accord with the negligible influence of rosin on pigment retention.

The effect of adding sodium carbonate to paper sized with 2 per cent rosin and 3 per cent alum was to neutralize the sulphuric acid that resulted from the hydrolysis of alum and thus raise the pH value.

Various amounts of sodium aluminate were added to stock which already contained 2 per cent rosin and various amounts of alum. It appears evident that alumina produced by the action of sodium aluminate on alum does not have the same electropositive characteristics as that produced by the hydrolysis of alum alone.

Experimental work on the effect of sodium silicate on the retention of fillers indicates that this material, likewise, has little or no effect. Retentions obtained with sodium silicate fall within the same range obtainable with corresponding amounts of

(1) Research Laboratory, National Lead Company, Titanium Division.
(2) Paper Development Laboratory, Titanium Pigment Corporation.

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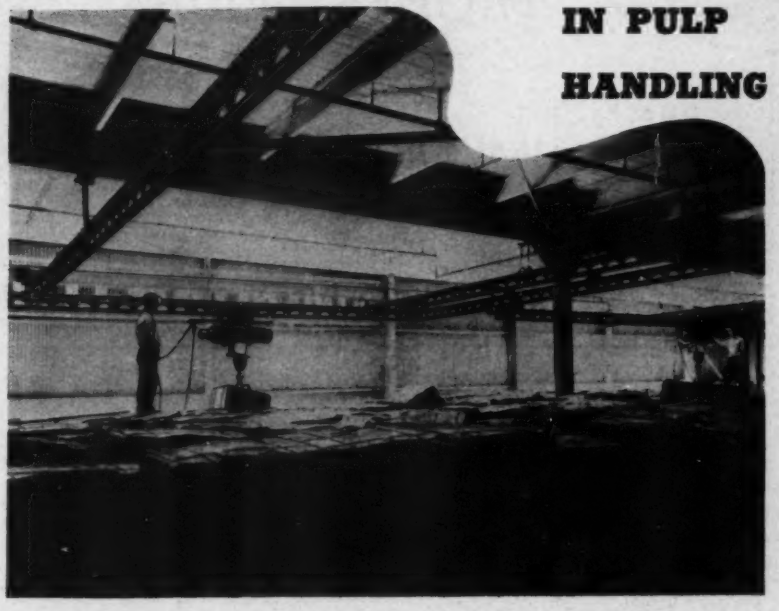

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rosin size which has been shown to play a very small role in the retention mechanism.

Experimentally it has been shown that starch exerts a deleterious effect on retention. The effect of alumina on starch is rather similar to its effect on fillers. The presence of an excess of starch might tend to reduce the action of the alumina in "fixing" the filler. The statement that starch might act as an electrostatic cement does not seem valid inasmuch as starch, like most fillers and fiber, is a negatively charged colloid.

The effect of diluting the stock at the sheet machine was to increase the adsorption of alumina and also to improve slightly the retention of titanum dioxide—most pronounced at the higher ranges of concentration. After the stock became very dilute, there was no appreciable change.

An increase in temperature aided retention. Evidently the adsorption of added alumina increased with the rise in temperature.

It is a well known fact that an increase in base weight will result in better filler retention, all other factors being constant. It is, likewise, a well-known fact that an increase in the hydration of stock results in improved filler retention.

Retention is a combination of mechanical filtration and colloidal factors. Its colloidal nature is dependent on the alteration of the cellulose fiber interface so that an attraction for negatively charged fillers will be induced on the fibers.

Some Aspects of White Water Flocculation

EDWARD N. POOR, Chemical Engineer
W. C. Hamilton & Sons

This paper deals with the treatment of white water containing, in addition to cellulose fibers, certain hydrophilic materials such as clay, titanium dioxide, asbestine and talc.

In the commercial save-all, specifically the Adka type, the reacting chemicals and air are injected into water flowing at high velocity through a mixing nozzle. High initial mixing not only expedites floc formation, but assures a large proportion of the fine particles becoming involved in the action at hand. The filler particles have a gravity twice that of water and if all are not immediately attacked, they may settle from the points of floc formation and not be recovered.

Sodium hydroxide treatment of white water, containing sufficient alum to produce a pH of 6.0-6.5, has proven somewhat satisfactory in the flocculation of highly filled mixtures. The action at ordinary temperatures is slow, being accomplished in 3-4 minutes. At a pH of 5.5, where investigators have found the insolubility of the alumina floc to be a maximum, flocculation is even less rapid. As a result, the efficiency of flotation is seriously impaired. However, in this case, the floc formed is not actually the alumina type, as defined, for it is adulterated with varying amounts of aluminum abietate and free rosin. While small proportions of these adulterants appear to be undesirable, larger amounts enhance the flocculating characteristics.

The use of rosin size in amount equivalent to .001 per cent rosin by weight of water, 1-2 per cent by weight of solids, with sodium hydroxide has a marked effect on .occulations. Rapidity of chemical action is increased by 25 per cent; and flotation is improved to a great extent. The greater rapidity of decomposition of the size over that of the hydroxide formation is extended as the reason for improved efficiency.

Most versatile of the agents which form gelatinous compounds by reaction with aluminum ion are long chain fatty acid soaps.

Their reaction is rapid, being accomplished in 1-1½ minutes at ordinary operating temperatures.

The resulting aluminum compound is highly gelatinous, enhancing the adherence of solid particles. It is porous, permitting air entrainment. It is very insoluble, resulting in its selective and rapid formation.

Up to this point the paper has dealt with flocculation as a result of the formation of an insoluble gelatinous compound as the medium promoting it. The use of sodium hydroxide at a high pH has exhibited the fact that such a compound is not essential.

Solids ranging from 0-100 per cent filler are flocculated in 30-60 seconds. Action begins at pH of 9.5 and attains a maximum rate at pH=10, higher alkalinities apparently having no effect.

The first three chemical flocculating combinations exhibited large variations in rate of chemical action encountered with the fillers, clay, titanum dioxide, asbestine and talc, but with any one agent the relative rates were substantially the same.

Investigation as to the reasons for the differences in behavior of the various fillers disclosed the possibility that the apparent decreased wettability of asbestine and talc by water might be a factor. It was postulated that the use of a wetting agent to decrease the forces acting at the filler surfaces should be reflected in those flocculating characteristics which depend to some extent on mechanical or physical adherence to gelatinous materials.

The wetting agents utilized consisted of (1) the active anion type, i. e., metallic napthalene sulphonates and (2) active cation as quartenary ammonium salts. The agents were used in concentrations ranging from .005-1.0 per cent by weight of water.

With sodium hydroxide and soaps (pH below 7.0), the active cation type appeared to be less effective than the active anion. In concentration of .01 per cent, rapidity of flocculation of talc was increased slightly. Above this concentration, an inhibiting action was evident, preventing complete flocculation.

The use of both types of agents with clay and titanum dioxide appeared to enhance slightly floc flotation.

With sodium hydroxide (pH 10), both

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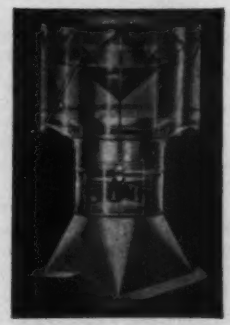

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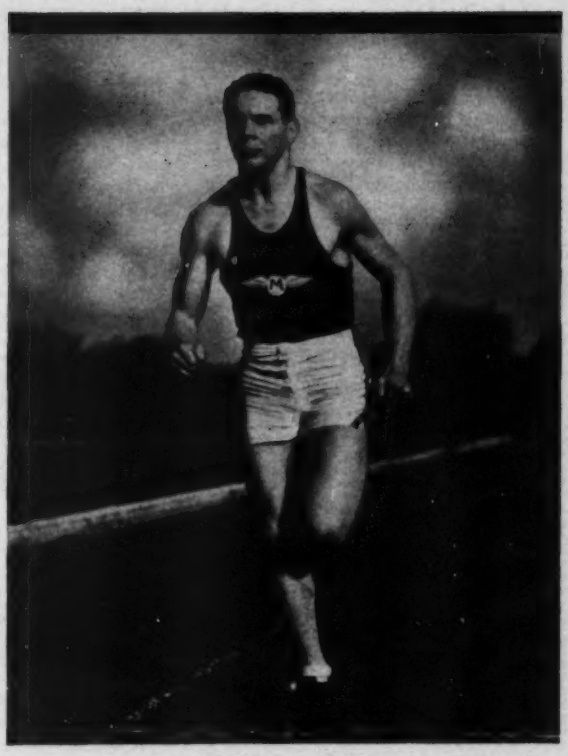

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types of wetting agents produced no visible changes in flocculating or floating characteristics of the various fillers investigated.

Conclusions resulting from this investigation are: Effectiveness of chemical flocculating agents depends in a large measure, on rapidity of ionization; formation of a gelatinous insoluble compound as the medium promoting flocculation is not essential; surface tension has a great influence on the efficiency of flocculation and flotation when induced by gelatinous mediums.

Engineering and Construction for Pulp and Paper Mills

H. K. FERGUSON

The H. K. Ferguson Company

There is, in some operating organizations, an inherent objection to the bringing in of outside professional engineering talent for consulting, or designing and general engineering purposes. Such objections are sometimes based upon the thought that the plant engineer with his own staff can do this work at little or no expense, because he knows his own particular plants and problems better than any one from the outside. Another objection may be that there are certain proprietary devices or methods peculiar to a particular process which it is considered undesirable to make accessible to any outsiders.

Many plants are now operating with skeleton engineering organizations, the time of which is admirably occupied in problems of current operation and maintenance.

A good deal of our own work of late years has come to us because of the developed policy of present manufacturers who have decided that they will not re-augment their own engineering organizations with open market men, but do prefer rather to employ outside engineering talent for a specific project, pay for it, and incur no future obligation.

With regard to the question of matters of confidential nature, it is usually the policy of worthwhile engineering and construction organizations to agree, in writing if desired, that they will regard the project as confidential and if required, return all plans and specifications to the owner, at the completion of the work.

Again, there is always the possibility that engineers, operating in many other plants and industries, may always bring to the problem under discussion new thinking and ideas which may be extremely helpful to plant organization men who are largely confined by their duties to an existing property.

Also, many corporations which have formerly built their own buildings, and installed their own machinery, with men on their own payrolls, are now calling us in to do this work for them. This is on account of possible complications between plant and construction labor organizations, if both are directly employed by the owner.

In this industry, as in every industry today, there is an increasing demand for improvement in quality of product, and particularly for maintaining the uniformity of product over a long period of time. There is also the increasing demand on the part of major executives for lower production costs in order to offset the constant upward trend of costs of raw materials, labor, taxes, distribution, sales expense, etc.

It is our definite belief that in developing the basis for experienced engineering judgment there is no better method than to first take up all matters of a controversial nature, judge each on its own merits, and then set down what is frequently called the "deadly parallel" of comparison. We, therefore, recommend that in approaching the determination of factors involved, we draw a definite line down the center of various sheets of blank paper, setting down on the left-hand side all the advantages for any particular site, type of raw material, selection of any particular type of manufacturing equipment, the various possible arrangements of the equipment, and the types and dimensions of the buildings to house it. On the other side of the line should be placed, after careful investigation, all the disadvantages of each item, so that decisions can finally be based definitely upon a clean cut statement of actually developed advantages versus disadvantages, with experienced engineering judgment deciding between the two in such a way that each component part of the whole scheme is selected on the basis of clear thinking and justifiable conclusions.

It is our definite belief that pulp and paper mills, designed, equipped, and built upon this basis, will continuously develop lower costs than other mills, too many of which in the past have been designed too much by rule of thumb and inbred and prejudiced thinking.

It also is our own belief that no major executive of a pulp or paper mill enterprise should fail to keep before himself constantly various definite alternatives as to what he can do, if and when certain exigent circumstances arrive in his industry, which are likely to warrant definite, major action in connection with his plant. Such alternate decisions may be very dangerous unless they are based on carefully worked out and sound engineering and accounting practice, over a reasonable period of time. Too many new plants, built on too quick decisions, have proved to be white elephants later.

Based upon current conditions, it is our further conclusion that no pulp or paper manufacturer at this time should build anything which he can possibly avoid building, particularly unless his plant is so arranged that he can break even or better on 70 per cent production. On this basis, it is, therefore, logical to assume that in order to keep himself and his company properly protected, he should at all times have developed currently the basic information which will enable him to build quickly and without interruption to existing production if and when the advantages of such a program specifically outweigh the disadvantages.

Today, due to increased cost for field labor for construction work throughout the country, for reasons beyond the control of any of us, in some areas a considerable amount of careful judgment is required for the selection of the proper materials for new buildings.

For example, in some places concrete aggregate materials and labor may be low in cost, which indicates definitely that the pendulum of advantage would swing toward a considerable use of concrete. On the other hand, labor costs and concrete aggregate materials may be very high in price, which normally would indicate the need of careful investigation to find out how much this burden may be relieved by the use of other materials.

In designing mills, such questions as condensation, interior temperature, cleanliness, proper daylighting, and ventilation are all of paramount importance.

Because of the considerable amount of electric power, and process steam required in pulp and paper making, a number of new mills have found otherwise satisfactory locations, close to large central station power plants, outside of large cities. Such sites, coupled with long time contracts for low cost steam and power, have proved very advantageous in cost reduction.

On the other hand, there are still many pulp and paper mill power plants which, if properly studied for the advantages and disadvantages of modernization, would show a quick pay-off of improvement cost, and a considerable consequent saving in the production expense.

The advancement of a new important, influencing factor in your process of manufacture may affect either favorably or unfavorably the capital cost of your plant structures. The keenness of your paper mill engineers and equipment designers in visualizing the need of improvement in process methods is continually contributing to this effect.

Some of such possibilities are:

1) Continuous and controlled stock preparation, including the hydrating and refining equipment design, may reduce power cost per ton of finished product.

2) Sheet formation, as particularly related to the Fourdrinier wire and its water removal properties, may need considerable research.

3) Machine coating and finishing as a continuous process, with the elimination of festoon dryers, is worth investigation.

4) Automatic sorting, counting and finishing still sounds fantastic to some manufacturers.

5) Reduction of finished broke and remaking cost of same directly affects the uniformity of finished product.

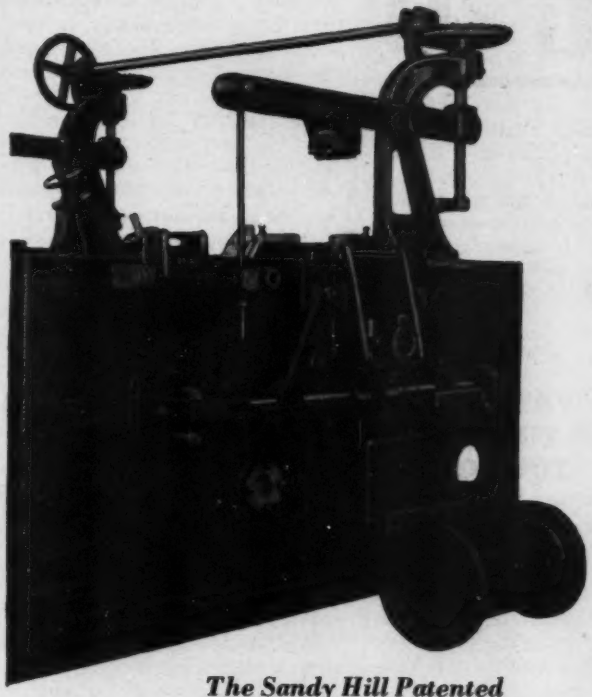
6) Recovery of white water waste, including chemicals, fillers and stock, and the economic re-use of such recovered furnish in the process is important.

7) The need for the elimination of foam is still evident in many mills.

8) Efficient moisture removal from the pulp and paper may have a far-reaching effect on the plant designs and overall efficiency.

There are many other unsolved problems, involving elements which at present contribute to the increased conversion cost, in pulp and paper making.

There is no universal rule for the design, construction and equipment of new plants or the rehabilitation of old plants, on any basis of complete standardization. In consequence, it becomes increasingly necessary to utilize all of the available clean thinking and engineering experience in your own organization, with the help or consultation services of experienced outside organization.



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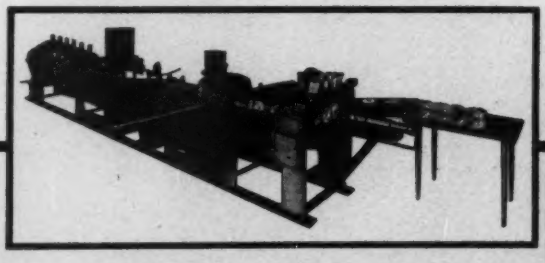

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The Moore Steam Turbine Corporation, Wellsville, New York, wholly-owned subsidiary of the Worthington Pump and Machinery Corporation, will now be known as the Moore Steam Turbine Division of the Harrison (New Jersey) organization.

The Moore Steam Turbine Corporation has been a subsidiary of the Worthington concern for the last three years, during which time increased sales and service activities has made it necessary to expand. A new manufacturing building and new equipment are about ready for use.

◆

CALCO EXPANDS ITS POWERHOUSE

The new addition to the powerhouse at the Bound Brook (New Jersey) plant of the Calco Chemical Division of the American Cyanamid Company, now nearing completion, will increase the ground area to 20,000 square feet. One new steam generator being installed will develop 120,000 pounds of steam per hour. Turbo-generators will develop enough electricity to supply a city of a quarter of a million people.

The new addition was necessitated by larger production requirements. This expansion furnishes additional evidence of the strong position occupied by the United States dyestuff industry today.

◆

COFFIN AWARDS MADE TO 22 G-E EMPLOYEES

Twenty-two General Electric Company employees, out of the 70,000 employed by that company, received awards on February 9 for their accomplishments. The awards comprised engraved certificates and a cash honorarium known as the Charles A. Coffin Foundation Awards, the highest honor conferred by the company on its employees.

The Awards were made for a great variety of accomplishments, ranging from the highly skilled efforts in assembling turbine buckets in power houses without disassembling the machines, to the development of a complicated engineering theory and its application to modern usage. The twenty-two awards were made for seventeen distinct accomplishments, four being made jointly to two or more individuals who co-operated in the work which brought them recognition.

The purpose of the Foundation award to employees is twofold: (1) to perpetuate the memory of Charles A. Coffin, organizer and first president of the General Electric Company; and (2) to recognize annually such employees whose accomplishments are sufficiently outstanding as to reflect the qualities of the founder of the company. A total of 500 employees have thus far received the award.

◆

WESTINGHOUSE BOOKLET TELLS PROGRESS STORY

Engineering Progress, a new publication of the Westinghouse Electric and Manufacturing Company, presents a most interesting story of the recent progress made in power and electrical development. The publication is filled with photographs of units and their application, in addition to installation views. These are supplemented with well-written literature in story form.

The booklet, forty pages in length, is divided into three main parts: Progress in Generation and Handling of Power, Progress in the Use of Power, and Electrical Developments of General Interest. Of interest to the paper industry is the explanation of a new type of pushbutton control for the paper machine turbine which, it is claimed, enables the operator to obtain any speed over a wide range, which may be as much as 25 to 1, simply by pressing a button.

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Beautiful sheet of paper? No, you're wrong. It isn't paper at all, but wide coils of stainless steel in the Massillon, Ohio, plant of Republic Steel Corporation. This plant has just been put into operation after expansion and improvement.

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HOUSE MAGAZINE INSTITUTE AWARDS

The *Monsanto Magazine,* published by the Monsanto Chemical Company, St. Louis, was adjudged the best in the internal field in a nation-wide contest conducted by the House Magazine Institute, New York City. Awards were announced recently by Lucian Bernhard, well-known type designer and head of the Institute's awards jury.

Other house magazines cited for their excellence included the *Hercules Mixer,* of the Hercules Powder Company, Wilmington, Delaware, which won third place in the internal field; *Inco,* of the International Nickel Company, New York City, which tied for third place in the external field; *The Paper Maker,* of Hercules Powder

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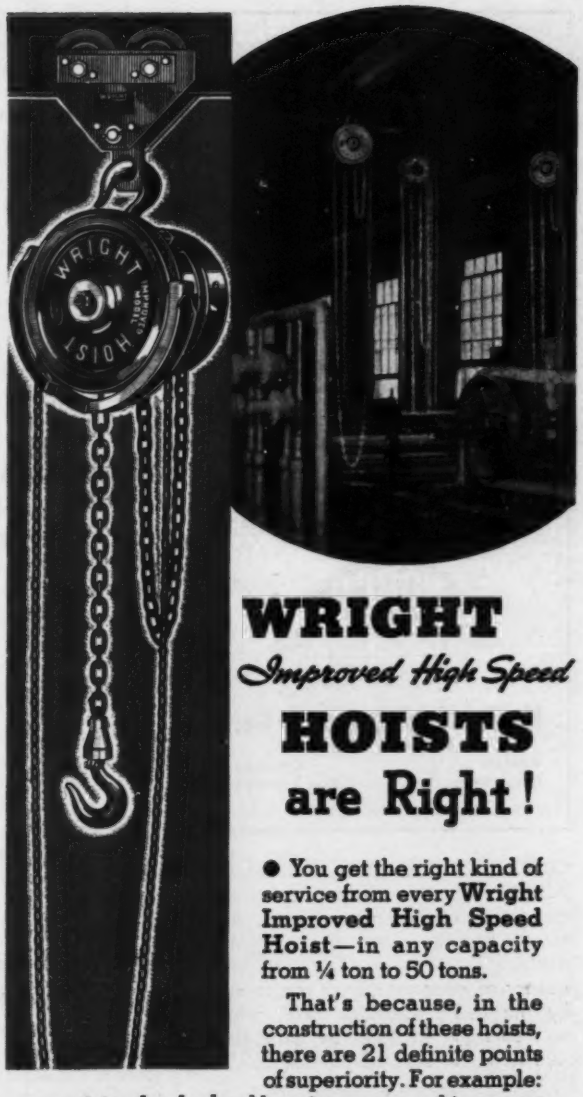

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Company, and *Steel Horizons* of the Allegheny Ludlum Steel Corporation. In appraising the entries for the contest the first of its kind ever conducted, the judges paid tribute to the high quality of editorial matter represented by the house magazine field, which was enlarged in 1939 by more than 400 new and revived publications.

◆

LINCOLN AWARDS EXPLAINED IN NEW BROCHURE

A new 48-page brochure which explains the James F. Lincoln Arc Welding Foundation's $200,000 industrial progress award program, has been published recently by the Cleveland organization.

This brochure is the official document of the 2½-year industrial progress program announced by the Foundation in January and is the culmination of more than a year of planning and development to formulate a program of industrial study and research which would be productive of greatest possible benefit not only to research but to society at large.

The publication embodies features which reflect the experience of the Foundation in conducting a previous award program (1937-1938) and also incorporates valuable comments and suggestions of educators, economists, sociologists, as well as executives and industrialists.

The brochure announces the purpose of the progress program, indicates the program's wide scope, and lists the 12 classifications and 46 divisions for participation which cover every conceivable branch of the industrial field, including the pulp and paper industry. Any individual interested in participating in the award program should obtain this brochure which may be secured gratis by addressing the Secretary, James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

◆

CONSOLIDATE MURRAY & PULP BLEACHING CO.

The D. J. Murray Manufacturing Company of Wausau, Wisconsin, and the Pulp Bleaching Company, Orange, New Jersey, have consolidated interests. Headquarters for both companies are now located in Wausau.

This combination brings into one working group the experience of over fifty years in the manufacture of machinery, plus extensive experience in the design and installation of process equipment. The new location places the companies' operating base near the geopraphical center of the pulp industry.

◆

TRANSPARENT-PLASTIC BOTTLE

A new sidelight to the milk bottle question is the announcement by a big glass manufacturer of the transparent-plastic bottle which, it is stated, may offer serious competition to both the ordinary glass bottle and the paper container. An item in a recent issue of *Newsweek* discloses that one of the largest United States glass manufacturers is planning mass production of this product. The advantage pointed out is that the plastic containers possess all the good points of the glass bottle and yet are extremely durable—thus enabling dairies to employ less care and more speed in washing, filling and handling.

◆

TWO PROMOTIONS AT CHAIN BELT

J. C. Merwin, vice president of the Chain Belt Company, Milwaukee, Wisconsin, is now also treasurer of the company and L. B. McKnight, sales manager of the company's conveyor division, has been appointed assistant to the vice president, it was announced recently. Mr. McKnight continues in the capacity of sales manager in addition to his new duties.

Mr. Merwin, who is a director of the Chain Belt Company, joined the organization in 1917 and was elected vice president in charge of the conveyor division in 1924. Prior to his election as vice president, he was works manager. Mr. McKnight has been associated with the company since 1926.

◆

STOW WILL SELL AND MANUFACTURE WHIRLFLEX DEVICE

All rights to manufacture and sell Whirlflex, a mechanical cleaner for piping in paper mills, have been acquired by Stow Manufacturing Company, Inc., Binghamton, New York. The Stow organization is now producing Whirlflex and is planning a promotion program in various countries throughout the world.

Whirlflex employs a flexible shaft drive to revolve the cleaning member of the device and the Stow company has been identified in this field of flexible shaft power application since 1875. The recent transaction was negotiated with the Whirlflex Company, Buffalo, New York, which holds all patents to the device.

◆

▶▶▶ A NEW TYPE OF MACHINE which prints transparent tape continuously while the tape is dispensed for use was announced recently. The tape dispenser is said to be only three inches larger than the ordinary tape dispenser and prints any message or simple trademark up to three inches long. The machine is manufactured by the Printape Co., New York City.

◆

ANNOUNCE MASTER PRODUCTS SERVICE

A three-point production service to help manufacturers speed recovery, absorb the unemployed and prepare for post-war competition of foreign manufacturers, has been announced by Charles H. Oppenheimer, president of Designers for Industry, Inc., an industrial design and engineering organization of Cleveland, Ohio.

The service, termed a "Master Products Service," was inaugurated by the Cleveland company. It is stated that the service involves the application of the scientific principles of modern product research, engineering development and product styling for the development of radical improvements that will create a definite obsolescence factor in existing products.

RECLOSING and RECUTTING

When your SCREEN PLATES become worn, this is the place to send them for Reclosing and Recutting. We have developed this work to a fine art on all types of

FLAT PLATES
BIRD SCREEN PLATES
JONES SCREEN PLATES.

We can cut your Screen Plate costs sometimes as much as HALF by our process. Satisfied customers from coast to coast testify a better job with MORE PLATES SALVAGED . . . LESS PLATES SCRAPPED. TRY US at our RISK.

FITCHBURG SCREEN PLATE CO., INC.

301 South Street, Fitchburg, Massachusetts

First Choice
of Industry!
DARNELL
Nearly 4,000 TYPES of CASTERS and WHEELS by DARNELL
For Savings, Service, Safety and Speed—Demand Darnell Dependability. A caster or wheel for every industrial use.
DARNELL CORP. LTD.
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Consultation, reports, valuations, and complete designs and engineering supervision for the construction and equipment of

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- STEAM AND HYDRO-ELECTRIC POWER PLANTS
- DAMS AND OTHER HYDRAULIC STRUCTURES

GLENS FALLS
MACHINE WORKS, Inc.

GLENS FALLS, N. Y.

• • •

Manufacturers of

Improved Rogers and Special Wet Machines

•

Standard Wet Machines

•

Glens Falls Rolling Action Flat Screen

•

The A. D. Wood Saveall, Thickener, Washer and Water Screen

•

Glens Falls Decker and Decker Washer

•

Glens Falls Rotary Sulphur Burner

•

Pulp Grinders, Three or Four Pocket

• • •

Write for descriptive literature

OTHER COUNTRIES

WASTE PAPER VALUABLE IN GREAT BRITAIN

In peace times England has been rather prodigal with her products and those of the Empire because there was little necessity for economy. War, however, has taught her to be less careless and one of the first campaigns in economy to be launched there is the "Save Waste Paper" Campaign to which more than 200 local authorities are giving earnest support.

Boy scouts, local councils and special organizations have made arrangements to collect a greater part of the paper and cardboard which hitherto had gone to the incinerator. The value of this refuse as a war-time asset may be judged from the fact that in peacetime less than 10 per cent was saved of the $300,000,000 worth of paper used in that country. Of the $80,000,000 worth of paper-making materials imported into England annually, more than $65,000,000 worth comes from the Baltic and Scandinavian countries, the shipping of which is liable to enemy interference at present. It is thus most important that the pulp mills recover as much waste material as possible.

An interesting sidelight to this "Save Waste Paper" Campaign are the steps taken to prevent the destruction of valuable documents. The loss of such documents was recently the subject of a discussion by the British Records Association.

This Association has asked 100 waste paper merchants to sort out and look for old parchments and handmade paper. Already many thousands of advisory leaflets and notices inviting ownees of accumulations of paper to make use of the Association's help have been issued. The notices point out that free advice will be given on what should be examined in any collection before the whole is consigned to the pulper. During the last war, it was said, many important papers were inadvertently destroyed.

◆

▶▶▶ A NEW PAPER MILL may be established in Burwaha, India, it is reported by the United States Department of Commerce. The mill will use grass for raw material and will produce cardboard and wrapping paper.

▶▶▶ THE PRESENT WAR HAS CREATED a demand for extra editions and special articles in Australia's daily papers so that newsprint consumption has been well maintained, the Canadian Trade Commissioner in Sydney has reported. He added that the United Kingdom had found it difficult to maintain shipping of newsprint while the Scandinavian countries had practically stopped deliveries. Imports of newsprint in rolls amounted to 172,157 in the twelve months ending June 30, 1939, of which Canada supplied 141,856 tons.

◆

▶▶▶ A MILL FOR THE MANUFACTURE of pulp from sugar cane bagasse has been planned by a Philippine Islands company. The mill is to be located near the Bais sugar central and will have an initial capacity of 16 tons per day.

◆

ITALIAN NEWS

Burgo Laboratory

Probably one of the greatest moves towards the planned independence of Italy in the wood pulp field is the recent establishment of the new experimental laboratory which will do extensive research on cellulose production through the use of national raw materials. Announcement of the construction of the new institution was received earlier (cf. THE PAPER INDUSTRY AND PAPER WORLD, p. 1192, Feb. 1940) but additional details have now been released.

The laboratory, established through a government agency and the Cartier Burgo paper mills, is fully described in a de luxe brochure, splendidly illustrated, published by the Italian company. The brochure points out that Italy, a country relatively poor in forests and particularly spruce, has been obliged to look for other materials. The only possible solution, says the publication, lies in the quick-growing vegetable materials native to Italy or its possessions. These are: grain, rice straw, hemp, flax waste, esparto, etc. The brochure, in addition to explaining how the laboratory came into being and pointing out its intended functions, contains numerous full-page photos of the laboratory facilities and equipment.

The laboratory staff, headed by Dr. Mario Michels, will not only concern itself with daily problems of actual manufacturing but will, in addition, study the selection of plants and their utilization, raw materials necessary for pulp and paper manufacture, utilization of by-products, co-ordination of analytical methods, etc.

The new laboratory includes an organic analysis department, an autoclave department and departments of microbiology, electro-chemistry, physical chemistry, pulp treatment and sheet forming. Several semi-commercial departments have been established. The work of the laboratory is carried on by a number of chemical engineers, paper technicians and a staff of young graduates, winners of Burgo scholarships, who will specialize in pulp and paper making.

◆

▶▶▶ THE GOVERNMENT OF BRAZIL has authorized loans to owners of lumber tracts for the manufacture of cellulose and wood pulp suitable for the production of newsprint, book paper and war materials. The loans, guaranteed by first mortgages on installation, are to be made for a minimum period of 15 years. Owners of plantations producing vegetable fibers suitable for the production of cellulose will be granted the same favors.

◆

▶▶▶ THE NEW PAPER MILL in Peru has started operation, says a recent report. The mill is expected to produce all staple lines of paper except newsprint from bagasse, cotton waste, linters, stalks and similar vegetable fibers.

◆

▶▶▶ EXPORT LICENSES ARE REQUIRED covering shipments of wood pulp and newsprint from Norway. It is not believed that the Norwegian restrictions on either exports or imports are likely to affect materially the normal trade between Norway and the United States.

◆

▶▶▶ THE UNION OF SOUTH AFRICA government announces that under the provisions of a trade agreement, Newfoundland will be granted duty-free entry under the minimum tariff on newsprint in reels or in the flat. Formerly, newsprint from Newfoundland was dutiable at 5 per cent under the intermediate tariff.

. . . of ordering alkalies have gone out of date! Use Solvay Alkalies in the manufacture of your paper. *They are always as specified.* Write for a copy of the *Solvay Products Book.*

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 RECTOR STREET NEW YORK, N. Y.

BRANCH SALES OFFICES:

Boston Charlotte Chicago Cincinnati Cleveland Detroit New Orleans New York Philadelphia Pittsburgh St. Louis Syracuse

SOLVAY ALKALIES

- SPEED
- FINISH
- LONG LIFE

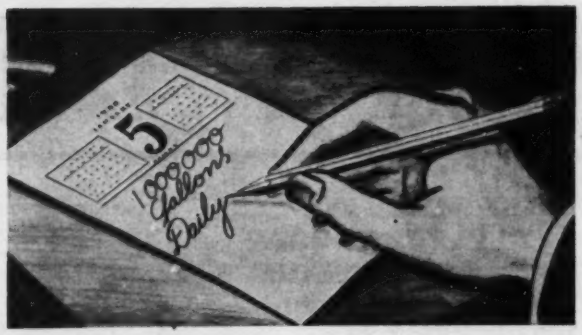
SKANEATELES FALLS, N. Y. is recognized as the home of the finest quality felts.

Throughout the nation, wherever skilled workmen are striving to produce the best quality papers—papers of standard, uniform quality—and at lower production cost, there you will find felts being used that were made in SKANEATELES FALLS, N. Y.

The greatest tribute that can be paid to the quality and dependable service of our felts is the fact that they are preferred by the men at the machines.

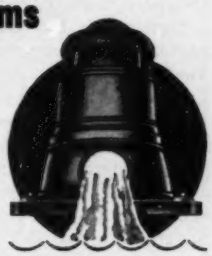
For speed, long life, dependable service and the finest finish, be sure to select felts made in SKANEATELES FALLS, N. Y.

The Waterbury Felt Co.
SKANEATELES FALLS, N. Y.



JUST WRITE THE QUANTITY

Layne Well Water Systems Will Fulfill Your Needs



For over half a century, the Layne Organization has been designing, building and installing municipal and industrial well water systems. Today about seven of every ten installations bear the name of Layne. Such a record denotes the highest in engineering skill and an uncompromising standard of quality.

AFFILIATED COMPANIES

Layne-Arkansas Co., Stuttgart, Ark.
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Layne-Louisiana Co., Lake Charles, La.
Layne-New York Co. . New York City, and Pittsburgh . . . . . Pa.
Layne-Northwest Co., Milwaukee, Wis.
Layne-Ohio Co. . . . Columbus, Ohio
Layne-Texas Co. . . . Houston and Dallas . . . . . Texas.
Layne-Western Co., Kansas City, Mo. Chicago, Ill. . . . Omaha, Nebraska
Layne-Western Co. of Minnesota Minneapolis . . . . . Minn.
Layne-Bowler New England Company, Boston . . . . . Massachusetts.
International Water Supply, Ltd., London . . . . . Ontario, Canada

Whatever your water needs may be, provided geological formation does not prohibit, Layne will adequately fulfill your needs in a contract that pre-specifies the cost per million gallons. Furthermore based upon past records, a Layne Water System assures you of the most years of service at the lowest upkeep cost.

Any City, Factory, Paper Mill, Oil Industry, Railroad, Irrigation, or other business official, may secure a complete file of bulletins, catalogs and folders on Layne Well Water Systems, without obligation, by addressing,

LAYNE & BOWLER, INC.
Dept. P, Memphis, Tenn.

LAYNE

PUMPS & WELL WATER SYSTEMS

For Municipalities, Industries, Railroads, Mines and Irrigation

SAFETY

WARN MILLS TO REPLACE FROZEN EXTINGUISHERS

Certain types of fire extinguishers have been seriously damaged by the extremely low temperatures experienced during January, according to a warning announcement issued by Fred Shepperd, manager of the International Association of Fire Chiefs. The damage has been very extensive in the south.

It has been urged that all soda-acid and foam extinguishers that might have been frozen be inspected at once so as to eliminate damaged appliances and restore fire protection. The damage done to soda-acid extinguishers by freezing usually can be detected but foam extinguishers should be opened to make sure that the inner container has not been crushed.

"The effect of freezing on soda-acid and foam type of extinguishers is to make them completely unfit for use," Mr. Shepperd said. "The expansion of the contents may weaken or burst the seams or stretch the copper shells. These damaged extinguishers cannot be repaired satisfactorily and in no case should owners attempt to solder the leaks and keep the extinguishers in service."

◆

▶▶▶ THE MICHIGAN PAPER COMPANY, Plainwell, Michigan, won first prize in the Michigan Liability Company Paper Mill Safety Contest for 1939 with a frequency rating of 7.36 per cent, it was announced recently. This company won first prize in 1936 and 1937 and was runner up in 1938. The company's safety committee was tendered a dinner in honor of the accomplishment and was presented with a bronze plaque by E. H. Valliere, safety engineer of the Michigan Mutual Liability Company.

◆

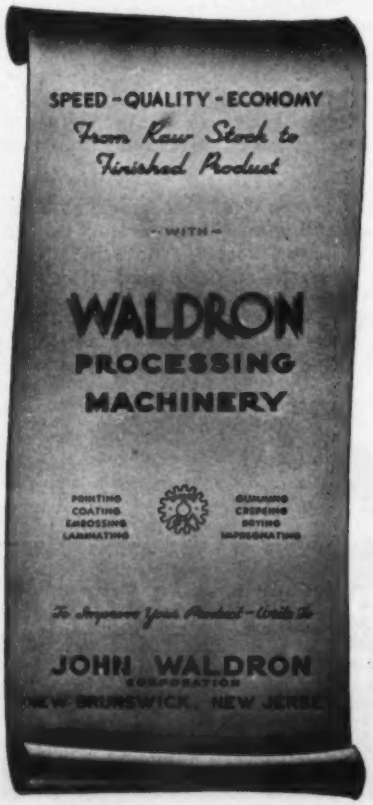
CORRECTION

The omission of one word resulted in an inaccurate statement in an item which appeared on page 1090 of the January, 1940, issue of this magazine. Instead of stating "The first accident ever to occur at the Mersey Paper Company, Liverpool, Nova Scotia," the item should have read "The first *fatal* accident . . ."

LIQUID CHLORINE SAFETY PLACARD

A liquid chlorine wall placard, which covers the usage and handling of liquid chlorine and includes safety recommendations, has just been issued by the Pennsylvania Salt Manufacturing Company, Philadelphia.

The placard is 19½ inches by 14 inches and is handsomely printed and illustrated in color. Safety directions are simple to follow and the placard is strongly backed with canvas for permanent usefulness. The safety placard is free to chlorine users upon request.



The Paper Industry Safety Contest

July 1, 1939 to June 30, 1940

Out of 179 mills reporting for January, 17 have perfect record

PERFECT SCORES
Division I—Pulp and Paper Mills

PARTICIPANT	MILL	LOCATION
GROUP A		
Price Brothers & Co., Ltd.	Kenogami, P. Q.	Canada
GROUP B		
GROUP C		
Southern Kraft Corporation	Continental Div.	York Haven, Pa.
*Escanaba Paper Company	Escanaba	Michigan
Strathmore Paper Co.	Woronoco	Massachusetts
American Writing Paper Corp.	Linden Div.	Holyoke, Mass.
GROUP D		
The Mead Corporation	Sylva Paperboard Co.	Sylva, N. C.
Bird & Son, Inc.	Phillipsdale	Rhode Island
Crown Zellerbach Corporation	Crown Willamette Paper Co. Div.	Lebanon, Ore.
American Writing Paper Corp.	Nonotuck Div.	Holyoke, Mass.
Spaulding Fibre Co., Inc.	Milton	New Hampshire
United States Gypsum Company	North Kansas City	Missouri
The Mead Corporation	Nashville	Tennessee
International Paper Co.	Livermore No. 11	Livermore Falls, Me.
Hollingsworth & Whitney Co.	Abenaquis Mill	Madison, Me.
International Paper Co.	Riley No. 23	Riley, Me.
Spaulding Fibre Co., Inc.	Hayes	New Hampshire
Division II—Paper and Board Re-Manufacturing		
Bay West Paper Co.	Green Bay	Wisconsin

*January report missing—covers six months only.

I will find a way

. . . or make one!

—Hannibal

KALAMAZOO VEGETABLE PARCHMENT CO.

Parchment — Kalamazoo — Michigan

Just Released

INDUSTRIAL SAFETY SERIES PAMPHLET-PPI

"PAPER AND PULP MILL SAFETY"

The purpose of this NEW pamphlet is to discuss safe methods, equipment and operations of paper and pulp manufacturing mills. It follows the Safety Code for Paper and Pulp Mills (Pl-1936) approved by the American Standards Association, and includes these subjects.

- The Yard
- Preparing Pulp Wood
- Rag and Old Paper Preparation
- Chemical Processes of Making Pulp Bleaching
- Mechanical Pulp Process
- Stock Preparation
- Machine Room
- Finishing Room

A copy of this pamphlet will be sent FREE to any plant safety director or executive on request. Just drop a line on company letterhead, to the Paper and Pulp Section

NATIONAL SAFETY COUNCIL

20 North Wacker Drive Chicago, Illinois

PERSONALS

MAYO RETIRES FROM UNION BAG

The paper-making industry lost one of its best and well-known men with the retirement of E. H. Mayo, general superintendent of the Union Bag and Paper Corporation's Savannah (Georgia) plant. Mr. Mayo is retiring because of ill health and will reside in Mobile, Alabama.

Mr. Mayo retires from the paper industry with a long list of developments to his credit of which his work in producing sulphate pulp from southern yellow pine is probably his greatest contribution.

Mr. Mayo was first associated with the sulphate industry in 1911 when he left the Munising Paper Company, Munising, Michigan, to become general superintendent of the Yellow Pine Paper Company, Orange, Texas. Subsequently Mr. Mayo joined the Southern Paper Company mill at Moss Point, Mississippi, retiring in 1931 to private practice as a consulting engineer. When the Union Bag and Paper Company opened its mill in Savannah he was prevailed upon to re-enter his earlier field and in 1936 he became production manager of that plant.

Succeeding Mr. Mayo as general superintendent at the Union Bag and Paper Corporation mill is T. T. Dunn, formerly assistant general superintendent. Mr. Dunn went to Savannah some time ago from the Bogalusa (Louisiana) plant of the Gaylord Container Corporation where he had been located for the past thirteen years. He is a graduate of the University of Louisiana.

E. H. Mayo (left) and T. T. Dunn, who succeeds him.

CRABTREE MADE V. P. AND G. M. OF FRASER COS.

Aubrey Crabtree, general manager of Fraser Paper, Ltd., Madawaska, Maine, has been appointed vice president and general manager of Fraser Companies, Ltd., Edmundston, New Brunswick. Colonel K. S. MacLachlan, president of the company, is relinquishing the post of general manager because of his duties as associate acting deputy minister of national defense. It was also announced that L. M. Sherwood, secretary and treasurer of the Canadian company, had been appointed vice president of Fraser Companies, Ltd., Fraser Paper Ltd., Fraser Realities, Ltd., and Restigouche Company, Ltd.

◆

WILSON TO DIRECT WORTHINGTON SALES

Charles E. Wilson, vice president in charge of Pacific coast operations of the Worthington Pump and Machinery Corporation since 1934, is moving his headquarters to the home office of the corporation at Harrison, New Jersey, where he will direct the sales of all products handled by the concern's Carbondale division. In this work Mr. Wilson succeeds H. A. Feldbush who henceforth will devote his time to the manufacturing department. Mr. Wilson is also assuming directional charge of the sales of all the corporation's products built at the Holyoke (Massachusetts) plant including compressors, rock drills, tools and turbine well pumps.

◆

▶▶▶ *Henri Roy,* director of the forestry school at Duchesnay, Quebec, has been appointed to succeed *Gustave C. Piche* as director of the Forestry Service of the Quebec Lands and Forests Department.

◆

DR. HOBSON ONE OF THREE BEST ELEC. ENGINEERS

Dr. Jesse E. Hobson, lecturer in electrical engineering at Northwestern University and consulting engineer for the Westinghouse Electric and Manufacturing Company, has been selected as one of the country's three outstanding young engineers by Eta Kappa Nu, honorary electrical engineering fraternity.

The fraternity annually makes its award to three electrical engineers under 35 years of age for the contribution of "meritorious service in the interest of their fellow men." Dr. Hobson was one of the three men honored for work done in 1939.

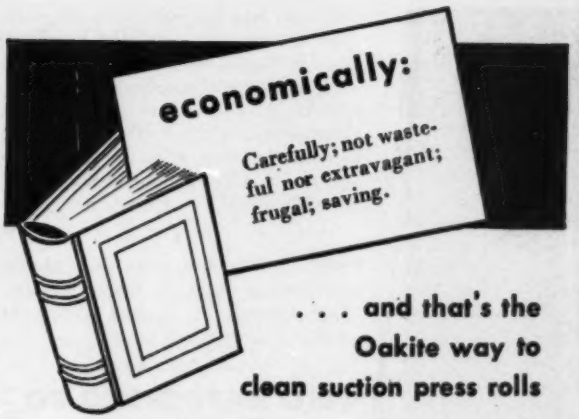
Dr. Hobson received a fellowship for graduate work at Purdue University and received his M. S. degree in 1933, following which he was awarded the Charles A. Coffin Foundation fellowship for study at the California Institute of Technology. While attending California, where he received his doctor's degree, Dr. Hobson designed and constructed a million-volt surge generator for use in breakdown tests on electrical equipment for the Boulder Dam.

◆

H. S. FALK NOW PRESIDENT OF FALK CORPORATION

Herman W. Falk, formerly president of the Falk Corporation, Milwaukee, Wisconsin, is now chairman of the board of directors of that company and Harold S. Falk, formerly vice president, is now president, it was announced recently.

Mr. Harold Falk, associated with the Falk Corporation since 1900, is widely known for his sponsorship of the apprentice movement throughout the country. In addition to building



. . . and that's the Oakite way to clean suction press rolls

If you are anxious to save time and money cleaning suction press rolls, investigate the easy, ECONOMICAL Oakite method. No drills needed! Just pour recommended Oakite solution over roll, let soak short time, then hose off. Imbedded slime, scale, resin, or dirt is thoroughly removed.

Chock-full of money-saving data on this and 27 other cleaning jobs is 20-page booklet every paper mill executive should have. Write for your FREE copy today.

Manufactured only by

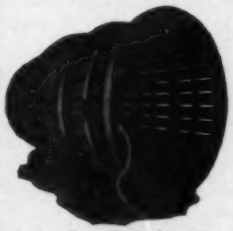
OAKITE PRODUCTS INC., 16 Thames St., NEW YORK, N. Y.

Representatives in All Principal Cities of the U. S. and Canada

OAKITE *Certified* **CLEANING**

WOOD ROOM AND PAPER MILL EQUIPMENT

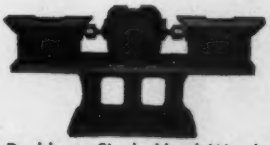
Quality . . . Experience . . . Service



Murray-Branch Barking Drum

Flat Screen

Murray Pulpwood Chipper



Double or Single Head Wood Cleaner

Murray High-Speed Hammer Chip Crusher

Collapsible Winder Shafts

D. J. MURRAY MFG. CO.

WAUSAU, WISCONSIN

SPEED CONTROL

at its best

PROBLEM

The Case of an Important Safety Control on Stoker Drives

from the files of Lewellen Engineers

● On stoker drives, any overtravel or rapid movement of the controlling device causes excessively rapid changes in the firing rate and corresponding accelerating loads to the stoker.

SOLUTION: *A specially designed Safety Lever to operate the Lewellen Transmission. While the lever follows any rapid motion of the controlling device, speeds are adjusted only at a safe, controlled rate of acceleration.*

RESULT: *A positive safety feature!* Should the control lever move suddenly, the speed is changed gradually by the action of the springs—the speed always coming to the speed corresponding with the position of the control which operates this safety device on the Lewellen Transmission. The controller operated from the steam pressure may move 90° without damage to the transmission.

YOU MAY BE directly interested in our solution of this problem. Hundreds of companies will profit by it. Here's our purpose, however, in bringing it to your attention. *We want to apply the same experience to your problem that we used in tackling the one mentioned above. We want to show you how your production machines may be controlled profitably by the proper application of Lewellen speed control.* Our engineers are constantly working with companies in order to solve their particular speed control problems. This is our specialty. It has been for more than 40 years. Think of the dollar saving in operating your machines at the correct speed!

—Why not call a Lewellen representative today?

LEWELLEN MANUFACTURING COMPANY, COLUMBUS, INDIANA

Lewellen

Variable Speed { **TRANSMISSIONS** **MOTOR PULLEYS**

★ Lewellen knows speed control

up an effective apprenticeship system in his own plant, Mr. Falk was chairman of the apprenticeship committee of the National Metal Trade Association for ten years and his accomplishments in industrial training and education led to his appointment to the Milwaukee Vocational School Board.

In addition to Mr. Falk's appointment the Falk Corporation has also announced the election of E. P. Connell as treasurer and M. A. Carpenter as secretary.

◆

CARL MAGNUS RESIGNS POST AT WATERFALLS

Associated with the Waterfalls Paper Mills, Mechanic Falls, Maine, for the past four years, Carl Magnus, general superintendent, has resigned. Mr. Magnus has been active in both the American Pulp and Paper Mills Superintendent Association and the Technical Association of the Pulp and Paper Industry and has been connected with the pulp and paper industry since 1915 when he graduated from the University of Maine.

Mr. Magnus began his career with the Dill and Collins Paper Company, later joining the Eastern Manufacturing Company. He was associated with the American Writing Paper Company from 1919 to 1921 and for the next fifteen years was plant manager for the Standard Paper Manufacturing Company. While with the Waterfalls Paper Mills he was instrumental in modernizing the mill. Mr. Magnus has announced no plans for the future.

◆

FELDBUSH NOW VICE PRES. AT WORTHINGTON

Formerly manager of Worthington Pump and Machinery Corporation's Carbondale division at Harrison, New Jersey, H. A. Feldbush has been elected a vice president of the organization and will make his headquarters at Holyoke, Massachusetts, where he will have charge of operations in the manufacture of air and refrigerating equipment.

Mr. Feldbush joined the Worthington organization in 1915 after graduating from Washington University. He was promoted to junior engineer in 1916, subsequently becoming engineer of tests, general superintendent, and works manager. He was instrumental in effecting the purchase of the Carbondale Machine Company by the Worthington corporation and the development of the corporation's line of Carbondale refrigerating equipment.

J. M. Cosgrove

▸▸▸ Now director of the Standard Steel Spring Company's development laboratory is *J. M. Cosgrove,* formerly chief chemist of Noblitt-Sparks Industries, Inc. Mr. Cosgrove will be actively interested in research on the corrosion-proof coating developed by the company.

◆

▸▸▸ At a meeting of the board of directors of the Revere Copper and Brass Company, it was announced that *J. M. Read* of New Bedford, Massachusetts, had been named a director.

◆

HAVEKOTTE NOW PRESIDENT OF INT'L-STACEY

For the past eight years a director and a member of the executive committee of the International-Stacey Cor-

Oscar M. Havekotte

poration, Oscar M. Havekotte has been elected president and general manager of the corporation to succeed the late Lewis J. Brown who passed away January 11. Mr. Havekotte was formerly associated with the Carnegie Steel Company and has been with that company and its successor, the Carnegie-Illinois Steel Corporation, ever since.

The International-Stacey Corporation has three operating divisions: The International Derrick and Equipment Division, Stacey Brothers Gas Construction Company and the Roots-Connersville Blower Corporation.

◆

▸▸▸ *G. Gordon Gale* was elected president of the E. B. Eddy Company, Hull, Quebec, to succeed *Victor M. Drury,* who resigned recently.

◆

TWO APPOINTED TO ADVISORY COUNCIL

New members of the Business Advisory Council for the U. S. Departpartment of Commerce are Thomas B. McCabe, president of the Scott Paper Company, and D. Robert Yarnall, president of the Yarnall-Waring Company, it was announced recently by W. L. Batt, president of SKF Industries, Inc., and chairman of the council.

◆

SEULBERGER AT NORTHWESTERN TECH. SCHOOL

Ferdinand G. Seulberger, formerly assistant educational director of the Lithographic Technical Foundation, New York City, has been appointed professor of co-operative education and director of industrial relations in the new Technological Institute of Northwestern University, Evanston, Illinois.

Professor Seulberger graduated from the University of Cincinnati in 1925 and became a member of the sales staff of the Westinghouse Electric and Manufacturing Company. Later he was associated with the Erie Malleable Iron Company. From 1931 to 1938 he acted as co-ordinator for the Drexel Institute of Technology.

In his new post Professor Seulberger will interview all new students to determine their fitness to receive training in the new institute. He will also maintain a record of all students and act as personnel advisor.

◆

▸▸▸ At a recent meeting of the board of directors of the E. B. Eddy Paper Company, Ltd., *C. Gordon Gale* was elected president, *John F. Taylor* was elected vice president and *R. P. Edgerton* was elected treasurer. *E. L. Milks* was made secretary and *W. S. Kidd* general manager. Mr. Gale has been a director of the E. B. Eddy Company for several years and has been vice president during the past year.

NECROLOGY

CHAS. H. HORNBECK

Superintendent and manager of the Kimberly-Clark Corporation's Neenah mill until his retirement in 1929, Charles H. Hornbeck passed away February 14 at his home in Appleton, Wisconsin. Prior to his association with the K-C organization, Mr. Hornbeck had been superintendent of the Frank Gilbert Paper Company, Waterford, New York, and the Atlas Paper Company, Skaneateles, New York. He was born in 1868 and had been ill some time before his death.

◆

▶▶▶ *John J. Fasmer,* general sales manager of the Stephens-Adamson Manufacturing Company, Aurora, Illinois, passed away recently. He was 56

John J. Fasmer

years of age and was well known throughout industrial circles. He had been associated with the Stephens-Adamson Company since its inception in 1901.

◆

FRED E. MURPHY

Known throughout the nation by virtue of his work as a newspaper publisher and by his views in regard to diversified agriculture, Frederick E. Murphy, executive head of the *Minneapolis Tribune* and director of the Associated Press, passed away February 14 in New York City. At the time of his passing Mr. Murphy was also president of the Manistique Pulp and Paper Company, Manistique, Michigan, and of Manistique Light and Power Co.

Mr. Murphy was born in Troy, Wisconsin, in 1872. He was graduated from the University of Notre Dame in 1893 and joined the *Minneapolis Tribune* as circulation manager. It was Mr. Murphy who, in 1920, saw diversification as the rejuvenation factor for agriculture in the northwest.

◆

▶▶▶ As this issue goes to press, word is received that *Mrs. Margaret Hodgins,* wife of Joe L. Hodgins, editor of *The Paper Mill,* passed away on March 2.

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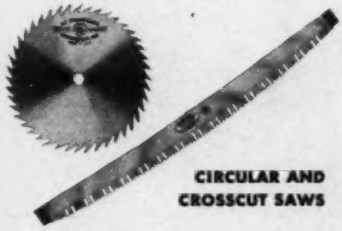


CIRCULAR AND CROSSCUT SAWS

CHIPPER KNIVES

PAPER SLITTERS, KNIVES AND SHEARS

NEW EQUIPMENT AND SUPPLIES

Black Liquor Pulp Washer

Oliver United Filters, Inc., 33 West 42d Street, New York, New York, has announced the development of a black liquor pulp washer of entirely new design. The unit, designated as the *Oliver Ring Valve Washer,* receives its name from the design of valve incorporated in it. The valve consists of an annular ring encircling the inside of the drum in line with outlets from each section. Each of these outlets in turn has two ports in the valve, one leading, the other trailing, which allows the liquor to enter the drum and from which it is discharged through one large trunion.

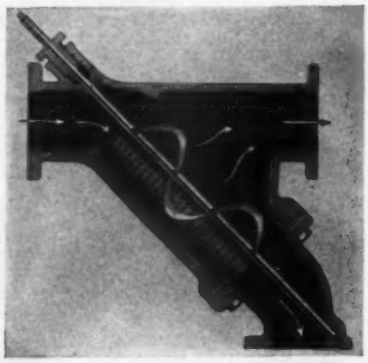
For washing purposes, arced gates are set at any desired point on both sides of the ports to cut off the flow into the drum and divert it through a hopper and out through the opposite end of the drum through a pipe, which also serves as the valve adjusting arm. Thus, the wash liquor can be separated from the strong liquor at any point desired. The cut-off can be quickly adjusted from the outside.

Other features of the washer, cited by the manufacturer, are: outlets midway between the ends of the drum; non-clogging, low pressure nozzles which lay a fan-shaped spray on the sheet; and drum designed to act as a receiver, keeping liquid and air separated, thus reducing foaming of liquors.

Rotary Scraper Strainer

Sarco Company, Inc., 183 Madison Avenue, New York, N. Y., has announced a rotary scraper strainer for pipe line installation. The strainer consists of a cylindrical screen, positioned within the branch of a threaded or flanged Y-fitting, together with a helically curved, knife-like scraper that snugly fits the inside screen wall and is rotated, either periodically by hand, or continuously by a suitable power drive. The standard screen is of perforated brass sheet, but other metals or wire gauze stretched over perforated metal can be supplied. The body of the strainer can be of cast iron, bronze, semi-steel, stainless steel, or cast steel. The ordinary drive for a power driven unit includes motor, reducer and flexible shaft. Where driving conditions are heavy, a universal joint drive shaft is used, the mechanism being protected against damage by overload with a safety shear pin coupling.

In operation, the desired material passes through the screen and out of the strainer body. The undesirable material, retained by



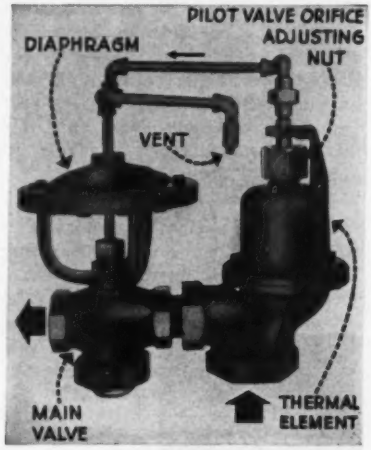
the screen, is scraped free of the screen and is discharged into a dirt pocket from which it is removed at intervals.

Where a degree of fineness is required, which is difficult to obtain with one screen size, two or more strainers are placed in series, the first strainer having the coarser perforations. When screening clay milk or coloring, the manufacturer suggests the use of a screen with a .039 in. perforation for the first strainer and a screen with a .005 to .01 in. perforation for the final strainer.

The manufacturer also recommends the installation of a duplicate set of hand-operated and motor-driven strainers for applications where an uninterrupted flow of material is essential. The hand-operated strainers, installed in a by-pass line, are operated when the screens of the power-driven strainers are being changed to permit cleaning of the fouled set.

Air Eliminator

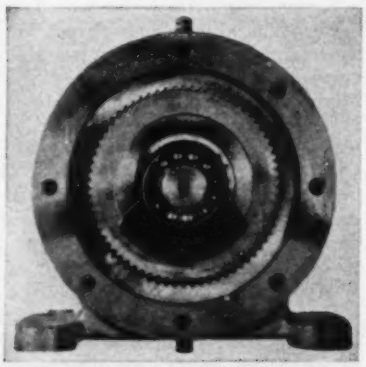
A valve arrangement, described as an air eliminator, has been announced by Armstrong Machine Works, 854 Maple Street, Three Rivers, Michigan. Operation of the unit is automatic and is based on the fact that air in a steam system has the effect of lowering the steam pressure and hence its temperature. A mixture of air and steam entering the unit cools the thermal element, which contracts and opens a needle valve. This, in turn, applies pressure to a diaphragm, which is depressed, thus opening main valve and permitting the steam-air mixture to escape. When the air has been exhausted, pure steam envelopes the thermal element, causing it to expand and close the needle valve. With pressure relieved above the diaphragm, internal pressure forces the main valve to close. To make sure that the valve remains closed when steam is turned off, a small compression spring is placed under the end of the valve stem. The unit is self-



compensating for changes in steam pressure, and its sensitivity can be adjusted by means of a needle valve regulating it. Applications of the unit, suggested by the manufacturer, include the removal of air from steam heated retorts, paper machine dryers, and from on-and-off steam mains.

Speed Reducer

The Brad Foote Gear Works, 1301 Cicero Ave., Cicero, Illinois has developed a speed reducer, designated as a gyro speed reducer, in which a double spur or combination spur and internal gear, ball bearing mounted on drive shaft eccentric, meshes with a stationary internal gear; and



in mesh with the secondary gear is either a spur or internal gear which is solid and concentric with the output shaft. The eccentric drives the initial spur gear around the pitch line of the stationary internal gear; and, since the initial spur gear and secondary gear are solid, the speed of the latter is controlled by the ratio between the initial spur gear and the stationary gear.

To obtain large ratios, a small difference in number of teeth between spur gear and

How Warren's "Pump Audit"

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Warren's Pump Audit is a new, straight-forward way to get the real facts about pumping efficiency in your mill. If some of your pumps use excessive power or require maintenance charges, this "Audit" will help reveal these losses, enable you to match your actual pumping costs against those obtainable with modern efficient pumps. On the basis of this thorough check-up, made with the help of Warren engineers, you can reduce power losses by a well planned program of pump replacement. For the full story on the "Pump Audit", see your Warren representative or write.

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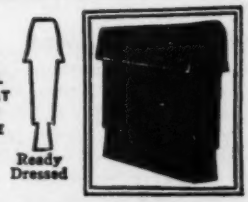

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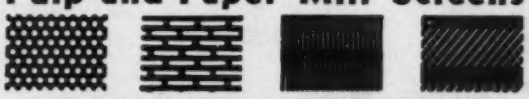

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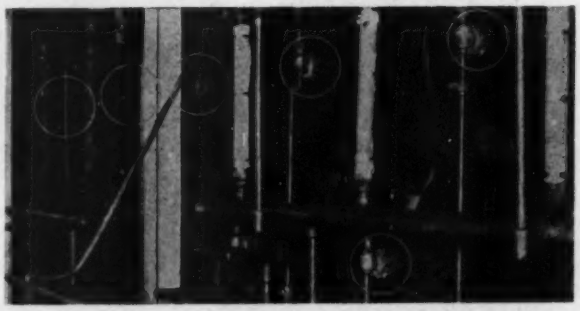

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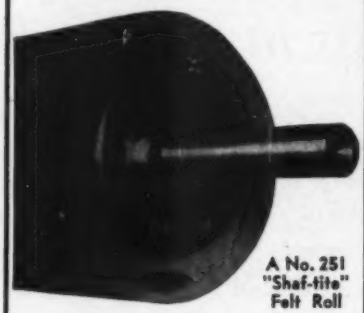

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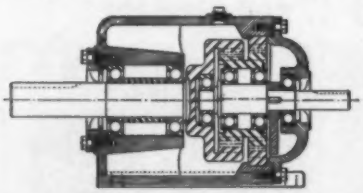
RODNEY HUNT MACHINE COMPANY
38 Maple St., Orange, Mass.

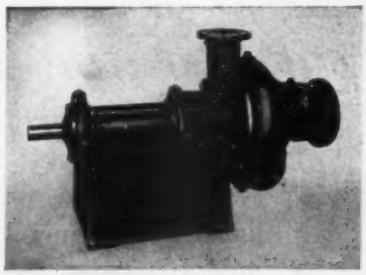
internal gear is used. This practice makes the pitch line of the spur almost conform to that of the internal gear. Thus a large number of teeth are engaged, thereby increasing the load-carrying factor. Efficiencies of the design range between 70 and 90 per cent with reduction ratios from 20:1 to 7500:1.



Paper Stock Pump

Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago, Ill., has announced a single stage, side suction, open impeller, centrifugal paper stock pump under the designation of Figure 5460. In this design the volute casing is diagonally divided along the shaft centerline with the lower half bolted to the pump frame. The suction fitting is bolted to the upper and lower casing halves. Washout connections are provided on both suction and discharge sides of the casing, and the suction fitting is provided with an inspection hole and cover plate.

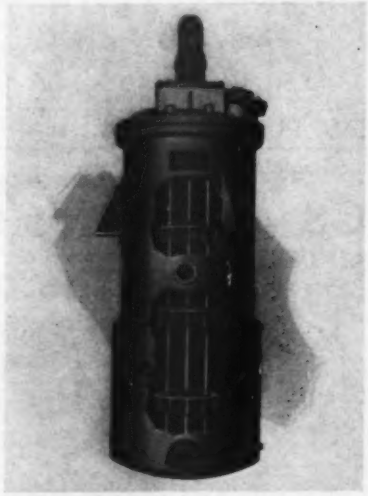
The two-blade impeller rotates within renewable casing liners and is secured on the tapered shaft end by an impeller hub nut designed to fit over the turned shoulder provided on the shaft. A bronze sleeve protects the impeller hub where it passes through the stuffing box. The suction side of the impeller has a screw or augur extension which "bites" in the stock being pumped.



Heavy duty roller bearings adjacent to the impeller carry the radial load, while a double row of ball bearings on the coupling end carries any unbalanced thrust of the impeller.

Gas Absorber

The Patterson Foundry & Machine Company, East Liverpool, Ohio, has announced a new line of gas absorbers. These absorbers, available in a wide range of sizes, are built of plain or stainless steel as well as of a variety of non-ferrous metals. The absorber, shown in the illustration, is 3 ft. in diameter by 7 ft. high, is designed for 60 lb. internal pressure and 100 lb. jacket pressure, is built of stainless steel, and is equipped with the Patterson Unipower agitator drive and with three 12 in. gas absorber turbines.

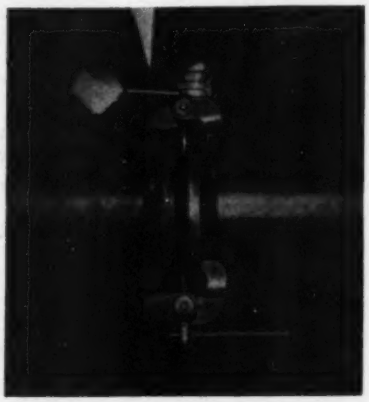


Wheel-Type Conveyor

A light-weight conveyor, with ball bearing wheels which need never be oiled, has been developed by the Metzgar Company, Grand Rapids, Michigan. Designed for the handling of boxes, cartons, crates and a great variety of other items of more or less uniform nature, and for loads up to 700 lb., the conveyor may be mounted on fixed stands or on caster-equipped stands if portability is desired.

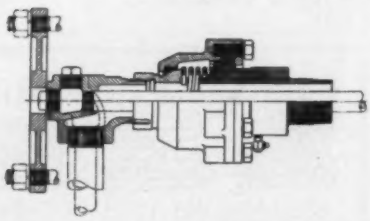
Gasket Replacing Tool

A tool for replacing gaskets in flanged pipe lines, called the *Flange-Jack*, has been introduced on the market by The Garlock Packing Company, Palmyra, New York. Consisting simply of two hinged jaws and a screw arrangement, the jack is made in three sizes—Midget for pipe sizes under 2 in.; Standard for standard flanges 2 in. to 20 in. inclusive and for extra heavy flanges up to 12 in. inclusive; and Giant for standard flanges 14 in. to 48 in. inclusive and for extra heavy flanges 10 in. to 30 in. inclusive. The tool is used in pairs, one directly opposite from the other.



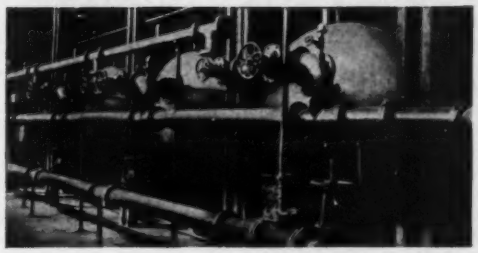
Revolving Joint

Barco Manufacturing Company, 1801-1815 Winnemac Avenue, Chicago, Illinois, has announced a 2-in. revolving joint to supplement it former line of ½, ¾, 1, 1¼, and 1½-in. sizes. Unlike the smaller sizes, this joint, when equipped with a syphon adapter, will have the inlet and outlet pipes alongside each other rather than in a straight line. The syphon adapter permits the joint to be used on drying cylinders, steam entering through the inlet opening and condensate being removed through the outlet opening. The rotating sleeve of the joint is the only part that revolves. This sleeve also slides out and in to take care of any end play in the revolving drum.



Joints larger than the 2-in. size, according to the manufacturer, are in the process of being designed.

Keep Your Process Water Clean



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TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

Rapid Control Moisture Determination in Pulps

The method applies to both pulp and paper samples, and the equipment is such that trained laboratory technicians are not needed, since the tests are simple and may be carried out by mill workers. The apparatus consists of a drying oven heated electrically, with automatic temperature regulation. It includes an analytical balance, and hot air circulation, and there is a graduated scale for reading off the values. From one to ten samples (each of varying moisture content) can be handled at one time. The hot air current accelerates the rate of drying very greatly, and the dried sample (in its tared dish) is transferred by means of a lever worked from outside the oven, to the analytical balance and then weighed. The loss in moisture is read off directly as percentage water content. Moist chemical pulp or groundwood usually require about 70 minutes for constant weight. Newsprint requires only 20 minutes, and board or air-dried pulp samples require about ½ hour. Samples that are dry and weighed may be removed and replaced with fresh samples without in any way interfering with samples which are still drying in the oven and not yet ready for removal. The article gives curves and diagrams. Göhde. Papier-Fabr. 37, 320-4 (1939).

Fractional Solution of Cellulose and Degree of Polymerization

A description is given of various methods of fractionation and the results are presented diagramatically. When carefully purified textiles are used as the raw materials, staple rayons are very low in low-molecular cellulose or soluble non-cellulosic material. However ordinary viscose contains much low-mollecular material. Chain length diagrams furnish a picture of the distribution of the various chain lengths of the cellulose in the fiber examined. It is important to note that the degree of polymerization (D.P.) of the fractions examined after extraction with a certain solvent are not the same for celluloses of different origin or history. This is true despite the fact that the solubility of the cellulose is a function of the chain length. In an unknown cellulose it is therefor essential to determine for its diagram the specific D.P. of the individual fractions. The following D.Ps. were determined: 3000 to 4000 for untreated cotton; 2000 for ramie pretreated with NaOH; 1000 for treated and bleached ramie; 1200 to 1600 for a highly purified cellulose (with a 96% alpha cellulose content); 800 to 1300 for paper pulps (or rayon fabrics) containing 85 to 92% alpha cellulose; 500 to 600 for cuprammonium staple rayons (made by the Schwarza-Lanusa process) 450 to 800 for special staple rayons; 250-350 for normal staple rayons and Cellophane foils; 200-350 for nitro rayons; and 250 to 300 for acetate rayons. Below a D.P. of 200 decomposition of the cellulose is apparent. Solution and chain length diagrams, while they show that untreated cotton cellulose is heterogeneous and has molecules of various lengths, low polymer components appear to be absent. The previously known fact that nitration causes no degradation is substantiated. Also, solution in cuprammonium is followed by degradation. Alkali treatment and bleaching of cotton linters (as carried out by the investigators) appear to produce no low polymeric substances. In the case of ordinary celluloses (wood pulps?) the cellulose is not sufficiently uniform or pure for rayon (i.e., cellulose acetate) or for gun cotton manufacture. Nor can it be used for making cuprammonium cellulose. Refining by meanss of alkaline baths is required. This treatment dissolves the low polymer components and to a large extent the contaminants. When these have been removed the chain length diagram of a purified cellulose becomes similar to that of cotton linters. However the solution diagram of such celluloses varies from that of linters in the region of high D.P. These diagrams give clues to the chemical changes that occur during alkaline treatment. The changes are not only effected by the alkali but by air which cannot be excluded in large scale operations. The authors illustrate the changes in solution diagram and distribution of chain lengths in a one hour commercial alkaline treatment. Cellulose is ripened in thick alkaline pulp suspension, and the viscosity rapidly lowered by the addition of oxidizing agents. When the proper "ripeness" is reached, the base is removed and the alkali cellulose (suitable for the viscose xanthation) is isolated without delay. In this process the long molecules are decomposed and the low molecular components are extracted. This leaves a relatively uniform product. The decomposition of the cellulose takes place largely prior to xanthation, and the xanthate is stable to oxidative change. This has been known before but was indicated further by chain length diagrams for normally ripened alkali cellulose, viscose staple rayon made from this, and special Schwarza staple rayon. The distribution of chain lengths is due in large measure to pre- and not to post-ripening or to the spinning process. When the alkali has once been removed, the D.P. of the first fraction is practically without change during the viscose process. An alkaline method was developed for wood cellulose which gave 98.8% alpha cellulose (3% pentosans) and which had a Cu. viscosity of 175 and a (nitrate) D.P.

of 850. This product resembles linters more than does ordinary wood pulp. While solution diagrams of the nitrates of various fiber grades of rayon pulps show wide variations in D.P. and alkali solubility at the start of the process, but similar behaviors at the end of the process. Due to what the authors consider differences in degree of crystallization or "packing" density, the chain length distribution curves differ markedly from the corresponding solution curves. Cellulose products having variable tear resistance, but an equal mean D.P. furnished practically identical solution and chain length distribution diagrams. There is a marked correlation between wet tear resistance and the orientation angle as determined by X-ray investigations. This indicates that the resistance to tear of a spun fiber is related to the parallel structure of the crystallites in the fiber. Hans Dolmetsch and Friederich Reinecke. Zellwolle u Deut Kunstseiden-Ztg. 5,219-27 and 299-307 (1939) through C.A. 34, 1167-9 (1940).

Alkaline Cooks of Beechwood and Bleaching Experiments

Earlier work has been extended, and the present papers give an account of a series of cooks in which the alkali concentration was kept constant at 3%, but where the composition of the liquors varied considerably (65-100% NaOH; O—35% Na_2CO_3; O—30% Na_2S). This composition had a marked effect on the properties of the pulps obtained, and by increasing or decreasing one of the components, the yields, the % lignin, the alpha cellulose, ash, furfural, and copper numbers also varied. The physical properties of the pulp sheets (density, swelling capacity, absorption, burst, tear, and folding endurance) also changed with changes in the composition of the liquor. A detailed study was made of the influence of these varying components, and the results are given tabularly and in a series of triangular graphs. Bleaching experiments were carried out with soda and sulphate pulps obtained in one-stage digestions. Whenever the soda or sulphate process was used, so that the lignin content was reduced to a "medium amount," a three-stage chlorination gave satisfactory bleaching, when alkaline treatments followed each bleach. Under such circumstances the consumption of chemicals was not abnormal. When NaC10 was used in place of chlorine in the first stage of the bleach, whiteness improved, but chemical consumption was higher. The bleached pulps showed high pentosan contents, but other chemical properties were satisfactory. Strength was somewhat (but not markedly) lower than with the corresponding unbleached pulps. Both bleached and unbleached pulps prepared by single stage cooks are satisfactory for papermaking. However the high pentosan content probably excludes them from rayon manufacture, although most of this component can be removed. When this is done however, the pulp yield is too low to make its use profitable. G. Jayme, H. Wagenbach and W. Deloff. Papier-Fabr. 37, No. 43/44, 353-7; No. 45/6 361-7 (1939). G. Jayme, K. Sam, and L. Rothamel. Papier-Fabr. 37, No. 17, 369-76 (1939) through Bull. Inst. Paper Chem. 10, 148-9 (1940).

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PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Shake Unit

Patent No. 2,175,765. Frank M. Sanger, Watertown, N. Y., assignor to The Bagley and Sewall Company, Watertown, N. Y., a corporation of New York. Application December 28, 1936, Serial No. 117,795. 14 Claims. (Cl. 74—44). A shake unit for Fourdrinier machines comprising, in combination, a rotatable drive shaft, a shake arm for connection with a Fourdrinier machine, and a variable operating connection between said shake arm and said shaft for giving said shake arms a reciprocating movement of variable amplitude, said connection including an externally cylindrical sleeve axially slidable on said shaft and having a cylindrical bore receiving said shaft, the axis of the bore being coincident with the axis of the shaft and the axis of the cylindrical sleeve as a whole being at an angle to the axis of its bore.

Paper Pulp Consistency Regulator

Patent No. 2,159,317. Edward L. Buchanan, Menasha, Wis., assignor to The Appleton Machine Company, Appleton, Wis., a corporation of Wisconsin. Application July 1, 1936, Serial No. 88,411. 5 Claims. (Cl. 92—46). In a device of the type described, in combination, a paper stock supply line, means for supplying water of dilution to said supply line, a vertical mixing line, an orificed ball seat in said mixing line, a ball for said seat and adapted to be raised by flow through said line to open said orifice, an open head box communicating with said mixing line, an overflow line extending from said box to said supply line, a pivotal counterweighted consistency-indicating wing valve extending across said head box and affording a path of travel for paper stock therebeneath, a forward dam of less height than said overflow line on the discharge side of said wing valve, a supply compartment for receiving paper stock from said dam, an overflow in said compartment at a lower level than said dam, means for transferring stock from said compartment to a paper machine, and means responsive to movement of said wing valve for controlling said dilution means. A device of the type described, comprising a head box having three compartments provided with progressively lower overflows, means for supplying paper stock to the first of said compartments and confining the flow of paper stock between the first and second compartments to beneath said valve, a movable dam between the second and theird compartments, a transverse partition and a pivotally mounted consistency-indicating wing valve below said position between the first and second of said compartments and confining the flow of paper stock between the first and second compartments to beneath said valve, a movable dam between the second third compartments providing a level of paper stock in the second compartment below that in the first compartment and providing for flow of the payer stock thereover into the third compartment, means responsive to movement of said valve for diluting said paper stock, and means for transferring paper stock from the third compartment to a paper machine.

Loose-Belt Drive for Paper Making Machines

Patent No. 2,176,431. Bernard A. Malkin, Lachine, Quebec, Canada, assignor to Dominion Engineering Works Limited, Lachine, Quebec, Canada. Application January 11, 1937, Serial No. 120,032. 14 Claims. (Cl. 74—242.7). A loose belt drive comprising upper and lower pulleys, a loose drive belt trained over said pulleys, a belt tightener movable to and from an operative position with respect to one run of said belt and means functioning automatically to move both runs of the belt outwardly to a position clear of the lower pulley in response to shifting of the belt tightener to an inoperative position.

Laminated Sheet Material for Use in Making Paper Bags or Wrappers

Patent No. 2,158,755. Theodore A. Hodgdon, Wilbraham, Mass., and Paul E. Hodgdon, Readsboro, Vt. Application September 16, 1936, Serial No. 101,098. 3 Claims. (Cl. 154—46). A laminated sheet comprising, a base member of transparent glassine, a transparent wax coating covering one surface, its opposite surface having a transparent wax coating thereon, opaque glassine strips secured to the second coating at the opposite side edges but spaced apart at the center portion of the base member, whereby the two coatings of transparent wax render the center portion more transparent.

Process of Making Paper Pulp

Patent No. 2,161,763. Edwin P. Jones, Garden City, N. Y., assignor to Champagne Paper Corporation, New York, N. Y., a corporation of New York. Application October 6, 1937, Serial No. 167,582. 1 Claim. (Cl. 92—13). That improved method of producing bleached pulp from flax or hemp tow, which consists in subjesting the tow to a predigestion operation in the presence of water at a steam pressure of from 60 to 80 pounds per square inch for from 25 to 40 minutes, then washing the tow, then subjecting the tow to a cooking operation in a digester with a solution of water of approximately 2 to 4 times the dryweight of the fiber, and 10 per cent to 20 per cent sodium hydroxide, and one-half to four per cent sulphur, the quantities of the chemicals employed in the solution being based on the dry weight of the tow, then washing the cooked fiber to remove water soluble impurities, and bleaching the washed pulp.

Single Ply Drier Felt with Asbestos Facing

Patent No. 2,172,430. William A. Barrell, North Andover, Mass., assignor to Lawrence Duck Company, Lawrence, Mass., a corporation of Massachusetts. Application October 14, 1937, Serial No. 168,856. 8 Claims. (Cl. 139—383). A drier felt for paper machines comprising a warp and filling of non-asbestos strands woven as a plain weave with alternate warp strands passing over, and intermediate warp strand passing under, the same picks of filling and each warp strand passing over and under successive picks in sequence, float warp strands containing abestos fiber each extending loosely over groups of successive picks and under single picks between such groups, and non-asbestos float warp strands similarly arranged with respect to said picks of filling, the asbestos and non-asbestos float warp strands being located in alternation with one another across the felt and protectively overlying the first named warp strands on the paper-contact face of the felt.

Separating Member for Jordan Engines

Patent No. 2,156,835. Archer Le Roy Bolton, North Andover, Mass., assignor to John W. Bolton & Sons, Inc., Lawrence, Mass., a corporation of Massachusetts. Application April 16, 1935, Serial No. 16,617. 1 Claim. (Cl. 92—27). A bodily transportable all metal separator for a Jordan engine having spaced paper stock treating members, which separator includes a low part of substantially uniform level and high parts along the edges and away from the edges of such size and shape as to cooperate with the paper stock treating members.

Stock Feed Box for Paper Machines

Patent No. 2,171,739. Earl E. Berry, Beloit, Wis., assignor to Beloit Iron Works, Beloit, Wis., a corporation of Wisconsin. Application January 15, 1937, Serial No. 120,733. 7 Claims. (Cl. 92—44). A stock feed box for a paper making machine having a movable forming surface which comprises a pair of side frame plates in spaced opposed relation, a base plate extending between said side plates, an angle plate between said side plates having a horizontal leg slidably supported on said side plates above the base plate and a vertical leg extending vertically downward between the side plates into spaced relation above the bottom plate, means for sliding said angle member relative to the side plates and base plate toward and away from the forming surface, a back plate sealing the space between the side plates and extending from the base plate to the horizontal leg of the angle plate, and means for feeding paper stock into the receptacle defined by the base plate, the angle plate, the back plate and the side plates whereby said stock can flow under the vertical leg of the angle member and onto the forming surface.

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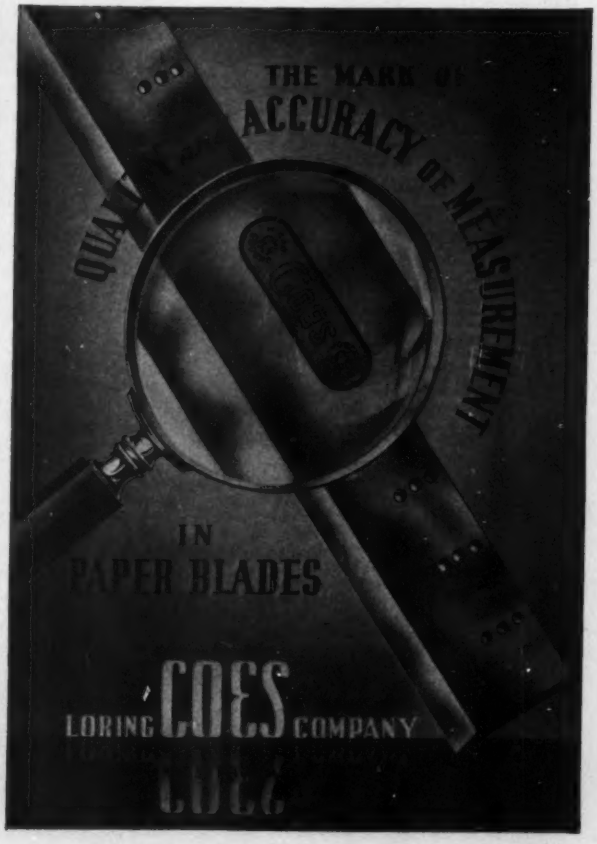

New Catalogues and Publications

Acme Steel Co., Chicago, Ill.—A very informative folder (Form Ad 14) which uses photographs and sketches to good advantage in illustrating how various products can be effectively and economically strapped against pilferage and damage, has been released lately by this company. The most popular of the Acme line of steelstrap tools and accessories are pictured, and photographs show the equipment in use. The use of printed strapping and trade-marked seals is also explained in this new publication.

Alexander Brothers, Inc., Philadelphia, Pa.—This company has recently issued an interesting booklet on its "Duplex" leather link belt. The booklet is illustrated and contains descriptions of the product together with price lists and specification tables.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.—A complete directory of engineering literature, bulletins and the many products manufactured by this company has been issued recently by this firm. Prepared in the form of a handy-sized 32-page book, the complete 1940 directory lists in numerical order more than 350 separate bulletins and other engineering aids now available from the factory on request. The directory also lists 1,610 different and widely diversified products that the company makes and also in a separate chapter lists 96 different trade names of company products.

Bender Warrick Corp., Birmingham, Mich.—This company's new bulletin (40) contains a complete description of the B-W all-electric floatless control system and also shows diagrams of the use of these controls on various liquid level applications. Price lists are included.

L. L. Brown Paper Co., Adams, Mass.—This company is distributing a revised catalogue which includes complete information about its four recently-announced new lines and which also gives detailed facts about the ledgers and bonds made by the company since 1849. A novel feature of this catalogue, which is of handy 3¾x7¼ inch size, is the index, which is designed to guide the reader in selecting the right paper for each of a large number of listed uses.

Combustion Engineering Co., Inc., New York, N. Y.—A new 24-page catalogue just issued by this company describes and illustrates the concern's "Elesco" superheaters. Details of construction of both the ball joint and welded types are covered and numerous diagrams show various arrangements for application to different types of boilers and to meet different conditions. Both illustrations and photographs serve to give the reader a clear idea of the product.

Fairbanks, Morse and Co., Chicago, Ill.—This company has recently issued a new bulletin (5810D) on its single-stage, split-case, centrifugal pumps. This well-illustrated and well-written bulletin explains the company's manufacturing facilities, gives general specifications of pumps and includes pump selection tables for different r.p.m.'s. Engineering data includes tables on friction of water in pipes, resistance of valves and fittings to flow of fluids, etc.

Flexrock Co., Philadelphia, Pa.—A new folder illustrating and explaining the uses and applications of this company's new product, "Colorflex," has been released lately. The product, pigmented resin which, it is claimed, will penetrate concrete floors without injuring them, is completely described in this folder. Many features of this surfacing material are brought out.

Foxboro Co., Foxboro, Mass.—A new 4-page illustrated bulletin (DMF 797) describing this company's "Teletax" electric transmission instruments for measurement and control, has been published lately. The system is used for transmitting measurement and control between two separated points. Actual installation photographs show the system in use in water supply systems. This company has also issued a 7-page bulletin (240) which explains the mechanism and operating characteristics of the potentiometer indicating recording controller.

General Electric Co., Schenectady, N. Y.—This new publication, "Little Known G-E Products for Industry," contains some interesting descriptions of unique equipment manufactured by this company. Its 19 pages contains photographs of such products as recording spectrophotometers, an electric foil gauge weft straightening control, an automatic light control, magnetic analyzer, etc.

D. W. Haering & Co., Chicago, Ill.—This company has issued a new folder on the Nelson chemical proportioning pump, which utilizes a "synchronized" drive, and for which the company has been appointed a national distributor.

Jeffrey Manufacturing Co., Columbus, Ohio—Catalogue 730 recently released by this company has to do with the company's "Mass-Flo" conveyor—a conveyor simple in design and construction. Complete details of this conveyor, which is said to handle a wide variety of materials, are found in the bulletin which gives capacity statistics and which contains cross-sectional views of the equipment.

Korfund Co., Inc., Long Island City, N. Y.—An interesting bulletin (Ba-14) describing this company's system of vibration control for concrete foundations has been published recently. The 8-page release, punched for loose-leaf filing, contains photographs and drawings, together with statistical material, which give the reader a clear picture of the company's vibration control system.

Link-Belt Co., Chicago, Ill.—A splendid new publication "Link-Belt Conveyors in American Industry" has been published recently by this company. Forty-eight pages in length, this copiously-illustrated book (1700) is not only a picture book of many different applications of mechanical elevating and conveying equipment but also a statistical bulletin. In addition there is much well-written literature on the theme of mechanized American industry. Two full pages are devoted to the pulp and paper industry. This book should be in every industrial library.

Lyon Metal Products, Inc., Aurora, Ill.—A four-page folder (1132) describing and illustrating the company's "Showerway" hand washing unit has been issued lately. The folder explains the construction and features of the unit and points out its uses in various capacities.

Morris Machine Works, Baldwinsville, N. Y.—A new bulletin describing a centrifugal pump which is guaranteed to be non-binding when handling thick, pulpy materials has just been published by this company. The bulletin explains the distinctive features of the pump. Illustrations are included in the release.

Morse Chain Co., Ithaca, N. Y.—A helpful book (R-54) of roller chain engineering data has been put out recently by this company. Complete and detailed information on construction, capacities and applications of the Morse roller chain is contained within this bulletin's 24 pages. Power transmission capacity tables, a guide for the calculation of chain lengths, tables showing sprocket dimensions and types, are a few of the features to be found in this release. Every industrial firm should have this bulletin on file for future reference.

Reliance Electric and Engineering Co., Cleveland, Ohio—Bulletin 502 put out by this company has to do with the company's motor-generator sets. Photographs and concisely-written literature make this release an interesting one.

Sarco Co., Inc., New York, N. Y.—A 7-page catalogue section covering temperature regulators and mixing valves of various types designed for the control of water and brine has been issued recently by this company.

Toledo Scale Co., Toledo, Ohio—Important and timely suggestions concerning motor truck scales and National Bureau of Standards regulations are contained in a brochure now being issued by this company. Included in the brochure are pictorial illustrations of the mechanical features of representative models in the three new motor truck scale lines this company is introducing.

United States Rubber Co., New York, N. Y.—The Mechanical Goods Division of this company has recently issued a 34-page booklet entitled "U. S. Hose Hints." The booklet is designed to enable customers to get more service out of the various types of hose used and to help select the correct hose for the specific purpose. In addition the booklet contains information in the form of tables, etc.; illustrates the various kinds of hose construction; lists various hose terms; methods of making hose, and explains how hose is tested before being placed on the market. Illustration in this booklet is very well done as is the reading matter.

Worthington Pump and Machinery Corp., Harrison, N. J.—Two new bulletins (L-600-B10 and W-205-B7) have been issued by this concern. The first bulletin deals with gas-engine compressors and contains extensive specification data, including photographs and drawings, on construction and operation of unit. The second bulletin explains the uses and construction of the company's steam-jet ejectors (two-stage condensing type). This bulletin also contains data and illustrations.

BOOKS

A Color Atlas for Fiber Identification—A complete series of charts showing the colors that are obtained from the reactions of the important stains with those fibers most commonly used in papermaking has been made available for the first time with the completion and publication of this book by John H. Grass, research associate and instructor in fiber microscopy at the Institute of Paper Chemistry, Appleton, Wisconsin, and associates. There has long been a demand on the part of fiber analysts for a standard set of color-charts to aid in the study of fiber reactions to stains but because of difficulties involved in the preparation of such charts, it has never been done before. The work involves accurate translation of these color reactions, seen only under a microscope, to the printed page. The Technical Association of the Pulp and Paper Industry and the American Paper and Pulp Association co-operated with the Institute in publishing this book. The author is well qualified to compile such a book in that he has spent most of his career in studying stains and stain reaction. Collaborating with Mr. Grass were I. L. Gartland, president of Color Laboratories, Inc., Harry Groesbeck of the Sterling Engraving Company, and Albert Vela of the Vela Company. The book is priced at $12.50 and is available from the Institute of Paper Chemistry.

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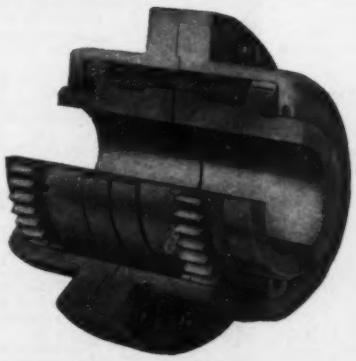

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Fancy Percales	3.25 to 3.50
New Soft Blacks	3.50 to 3.75
New Light Seconds	1.75 to 2.00
New Dark Seconds	1.60 to 1.75
Khaki Cuttings—	
Mixed	3.00 to 3.25
O. D.	3.50 to 3.75
New Canvas	7.75 to 8.25
New Mixed Blacks	2.50 to 2.75
Shirt Cuttings—	
New White No. 1	7.50 to 7.75
Silesias No. 1	4.50 to 4.75
New Unbleached	7.50 to 7.75
Fancy	2.25 to 2.50

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OLD RAGS	per cwt.
Roofing—	
No. 1	1.40 to 1.45
No. 2	1.25 to 1.30
No. 3	1.15 to 1.20
Twos and Blues—	
Repacked	2.00 to 2.25
Thirds and Blues—	
Repacked	1.80 to 2.00
Miscellaneous	1.65 to 1.75
White, No. 1—	
Repacked	3.00 to 3.25
Miscellaneous	2.75 to 3.00
White, No. 2—	
Repacked	2.50 to 2.75
Miscellaneous	2.00 to 2.25

RAGS (Foreign)
ex dock New York City

NEW RAGS	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)
ex dock New York City

OLD RAGS	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shapporins	

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f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	2.40 to 2.60
Domestic	2.50 to 2.65
Wool Tares—	
Light	2.35 to 2.50
Heavy	2.50 to 2.60
No. 1 Scrap Bagging	2.20 to 2.40
Manila Rope—	
Foreign	4.50 to 4.75
Domestic	4.75 to 5.00
New Burlap Cuttings	2.25 to 2.50
Jute Threads—	
Foreign	3.25 to 3.50
Domestic	3.00 to 3.25
Strings—	
Sisal	2.25 to 2.50
Soft jute	3.25 to 3.50
Mixed	1.00 to 1.25

WASTE PAPER
f. o. b. New York City

	per cwt.
Shavings—	
White Envp. Cuttings	2.85 to 3.10
Ord. Hard White No. 1	2.35 to 2.60
Ord. Soft White No. 1	2.10 to 2.25
Soft White, Extra	2.50 to 2.65
Flat Stock—	
Stitchless	.95 to 1.00
Overissue Mags	.85 to .95
Solid Flat Book	.75 to .85
Crumpled No. 1	.65 to .70
Solid Ledger Books	1.75 to 1.90
Ledger Stock—	
White	1.50 to 1.65
Colored	1.05 to 1.15
New B. B. Chips	.35 to .40
Manilas—	
New Env. Cuts	1.90 to 2.00
New Cuttings	1.50 to 1.60
Sulphite Wrappers	.45 to .50
No. 1 Old Kraft	1.15 to 1.25
News—	
No. 1 Wh. News Cuttings	1.50 to 1.60
Strictly Overissue	.75 to .80
Strictly Folded	.50 to .55
No. 1 Mixed Paper	.27½ to .32½

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	3.75 –
Ground, cwt.	3.80 –
Powdered, cwt.	3.90 –
Blanc Fixe—	
Pulp, bulk, ton	32.00 to 35.00
Dry, barrels, pound	.0250 to .0275
Bleaching Powder—	
Drums, cwt.	2.00 to 3.00
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	11.50 to 12.00
80-100 mesh (bags), lb.	13.50 to 14.00
Argentine, lb.	10.50 to 11.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	7.50 to 15.00
Domestic Coating	
Bulk (mine) ton	11.00 to 22.00
Imported (ship side)	
Bulk (lump) ton	15.00 to 25.00
Chlorine—	
Tank cars (wks) cwt.	1.75 to 1.90
Gelatine (silicin), lb.	.53 to .55
Glyc. (C.P.) drums, lb.	.1250 to .1300
Litharge, powd., bbl., lb.	.08 –
Rosin (Gum)—	
New York, 280 lb. barrel	
E, per bbl.	6.55
F, per bbl.	6.85
G, per bbl.	6.90
WW, per bbl.	7.60
Rosin (Wood), per bbl., carlots	4.60 to 7.00
Salt Cake—	
Dom. bulk (wks) ton	16.00 to 17.00
Imp. bulk on dock—	
(Atl. ports) ton	20.00 to
Soda Ash—	
Bulk (works) cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.25
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—Ammonia,	
Solid, drums, cwt.	2.30 –
Ground and flake, drums, cwt.	2.75 –
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.00
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.20
Starch—	
Pearl, 140 lb. bags, cwt.	2.45 –
Pearl, barrels, cwt.	2.70 –
Paper (8p.) bags, cwt.	2.55 –
barrels, cwt.	2.80 –
Sulphur (crude)—	
(mine) bulk, long ton	16.00 to 20.50
Talc—	
Dom. 100 lb. bags (mine) ton	15.00 to 18.00
Imp. bulk, ton	23.00 to –
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05¼ to .05½
Calcium Pig., bbls., lb.	.05¼ to .05½
Zinc Sulphide, bbls., lb.	.07½ to .07¾

CHEMICAL PULP
(Air-dry ton)

	per cwt.
Soda (Dom.) del'd. mill—	
Bleached, contract	2.90 –
Sulphate (Dom.) f. o. b. mill—	
Bleached	3.50 to 3.75
Kraft No. 1	2.25 to 2.50
Kraft, Southern, del.	2.00 to 2.25
Sulphate (Imp.) on dock—	
Bleached	3.50 to 4.00
Kraft No. 1	2.50 to 2.75
Kraft No. 2	2.25 to 2.50
Sulphite (For.) On dock—	
Prime bleached	3.25 to 3.50
Prime easy bleach	3.00 to 3.25
Prime strong unbl.	2.75 to 3.00
Sulphite (Dom.)	
Bleached, contract	3.00 to
Unbleached, contract	2.50 to

MECHANICAL PULP
(Air-dry ton)

	per ton
No. 1 Dom. & Can. (f. o. b. pulp mill)	30.00 to 33.00
No. 1 Imp. (On dock)—	
Moist	38.00 to 42.00
Dry	40.00 to 45.00

PAPER
f. o. b. New York City

	per ton
Boards—	
Binders	72.00 to 78.00
Chip	35.00 –
Chip, sgl. mla. lined	50.00 to 55.00
Coated, white patent	
.016	70.00 –
.020 and heavier	67.50 –
Kraft liner	55.00 –
News	35.00 –

	per cwt.
Book (coated)	
No. 1 Glossy Coat	11.90 to 13.50
No. 2 Glossy Coat	10.35 to 11.75
No. 3 Glossy Coat	9.55 to 11.00
No. 4 Glossy Coat	9.15 to 10.50
No. 3 Offset	7.70 to 9.00
A Grade M. F.	6.40 to 7.15
A Grade Super	6.65 to 7.40
B Grade M. F.	5.95 to 6.70
B Grade Super	6.20 to 6.95
B S. & S. C. Litho	6.45 to 7.20
B M. F. Litho	6.20 to 6.95
Ivory & India	.50 cwt. extra
Bonds (Rag Content)—	
100% Rag	39.10 to 46.00
Ext. No. 1	31.05 to 36.50
100% Rag	
85% Rag	23.60 to 27.75
75% Rag	20.50 to 25.00
65% Rag	17.55 to 21.50
50% Rag	14.65 to 17.75
25% Rag	1.00 cwt. extra
Regular Colors	

	per cwt.
Bonds (Sulphite)—	
No. 1	8.95 to 11.00
No. 2	8.05 to 9.75
No. 3	7.60 to 9.25
No. 4	7.30 to 9.00
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)—	
Embossed (25 lb. up)	12.75 –
Bleached (25 lb. up)	11.75 –
Unbleach. (25 lb. up)	10.50 –
Greaseproof—	
Bleach. (25 lb. up)	10.25 –
Unbleach. (25 lb. up)	9.25 –
Ledgers (Rag Content)—	
100% Rag	
Ext. No. 1	40.25 to 47.25
100% Rag	32.20 to 37.75
85% Rag	29.90 to 35.00
75% Rag	24.75 to 29.00
65% Rag	21.65 to 26.25
50% Rag	18.70 to 22.75
25% Rag	15.80 to 19.25
Regular Colors	1.00 cwt. extra
Ledgers (Sulphite)—	
No. 1	10.10 to 12.25
No. 2	9.25 to 11.25
No. 3	8.50 to 10.75
No. 4	8.50 to 10.25

	per ton
News—	
Rolls (Contract)	50.00 –
Rolls (Spot)	(nominal)
Sheets	58.00 –

	per ream
Tissues (Carlots)—	
White, No. 1	.92½ –
White, No. 2	.85 –
Anti-Tarnish M. G.	.80 –
Colored	.87½ –
Kraft	.80 –
Manila	.65 –
Napkins, semi-crepe (12¾ lb. to M shts.) per cs.	.41 –
Napkins, full crepe and emb'sed (12¾ lb. to M shts.) per cs.	.43½ –
Toilet, Bleached (M shts.) per cs.	5.80 –
Toilet, Unbleached (M shts.) per cs.	3.50 –

	per case
Towels—	
Bleached	3.10 to 3.65
Unbleached	1.95 to 3.30

	per cwt.
Wrappings (Kraft)—	
Extra Quality	5.00 to 5.50
Super-Standard	4.62½ to 5.00
Northern Standard	4.25 to 4.50
Southern Standard	4.00 to 4.25

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)

	per cwt
Bleached papers—	
M.F. & M.G. Waxing, 20 lb. (Carloads only)	6.15 –
(10,000 lbs.)	6.40 –
Drug wrapp. 35 lb.	6.25 –
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	4.50 –
No. 1 Butchers	4.75 –
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	5.00 –
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	4.75 –
Steam Finish, 50 lb.	3.75 –
Water Finish, 40 lb.	4.50 –

Manilas—

Envp. Mla., Sub. 16-40 (No. 1)	5.00 –
Envp. Mla., Sub. 16-28 (No. 2)	4.75 –
Envp. Mla. (Prices based on large sheets untrim'd reammarked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	5.25 –
No. 2	5.00 –
M. G. Sulphite and Kraft (other than Waxing)	
Grade A-25 lb.	5.75 –
Grade B-25 lb.	5.25 –

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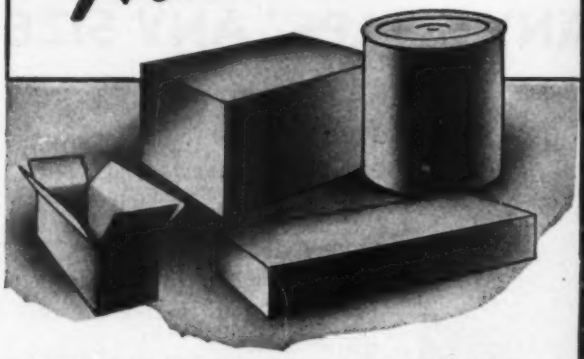

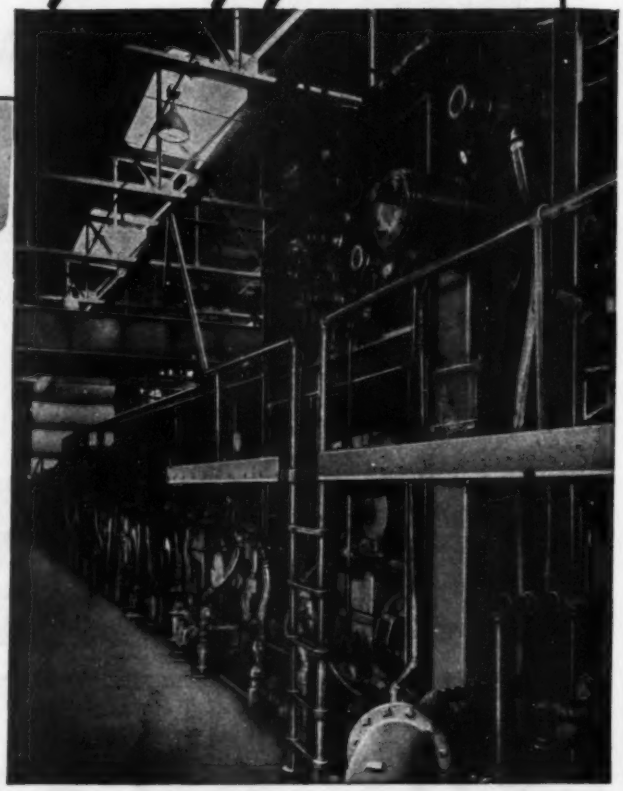

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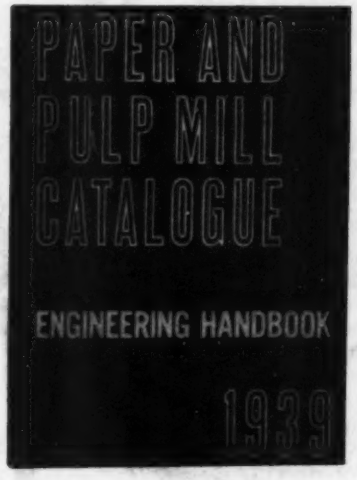

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